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**JOINT FORCES STAFF COLLEGE
JOINT ADVANCED WARFIGHTING SCHOOL**

**ENGAGE! A Deliberate Planning Model for
The Future Development of Space Power in the Department of Defense**

by

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A paper submitted to the Faculty of the Joint Advanced Warfighting School in partial satisfaction of the requirements of a Master of Science Degree in Joint Campaign Planning and Strategy.

The contents of this paper reflect my own personal views and are not necessarily endorsed by the Joint Forces Staff College or the Department of Defense.

Signature: _____

13 May 2005

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ABSTRACT

In preparation for this paper the author researched extensively through books, space policy statements, research projects, as well as speeches and position papers sponsored by the commander of Air Force Space Command. This Air Force Major Command holds the largest portion of the military space mission areas and is the most heavily funded of the services. Much like other national policies and positions, space policies have often come as others have studied how budgets have been allocated, and most recently, how American space leaders have articulated the collective vision for the road ahead. It was interesting to extrapolate from their words in order to grasp not only their immediate intent, but also what the author views as their long term strategy for guaranteeing the nation's security.

The expectation is that no senior military leader would, publicly or otherwise, advocate for a dramatic change in a fiscally constrained environment, to current policy, much less a separate military service. However, the author's motivation was to take much of the current data and move it through the military decision making process (MDMP) in order to propose a direction for the future of American military space power. The point of departure for selecting this topic centers on the author's opinion that the current policy is an extension of previous policies and doctrine and has not been adequately derived from an internal effort to determine the best course for America.

The military decision making process is embedded in the Deliberate Planning Process, and to a different degree within the Crisis Action Process, which is a focus for graduates of the

National Defense University's Joint Advanced Warfighting School (JAWS). The author sought to integrate the end of course writing requirement with the core curriculum requirement. The synthesis is expected to satisfy the course objectives for the former, while providing a practical application for the latter.

All research was unclassified. Throughout the evolution of this project, many senior leaders indicated through their writings, speeches and testimony, that the United States must take steps to not only understand space, but also leverage it for the benefit of all peoples. They also made the additional distinction that, since the US was most dependent on space, it therefore had the most to lose and should act accordingly to protect the nation's interests in, through and from this medium. The author found a multitude of information which served as background for the development of objectives, tasks, potential strategies and end states. Rather than beginning with a strategy and then orchestrating the objectives and tasks to match, the author suggests clearly identifying the end states and the objectives and using those to derive the associated tasks.

The MDMP encompasses a tested and formal model for decision making and strategy development which the author believes to be a crucial mechanism toward ensuring the best road ahead for American national security. The exercise of this process as a problem solving tool offered a key opportunity to explore and refine the skills that JAWS seeks to develop and export, through its graduates, to combatant commanders and the joint staff.

CHAPTER 1

INTRODUCTION

A new strategic opportunity clearly exists. The reality of the current world situation demands that we provide new means, concepts and processes to exploit the space medium in better and different ways in order to provide US decision makers the data and information necessary to help solve the toughest military and intelligence problems...Our toughest challenges demand new capabilities to improve and transform our space forces. We seek to create an integrated mix of land, sea, air, cyber and space power that provides additional options...

Hon Peter B. Teets National Security Space Air & Space Power Journal Summer 2004

Currently the Air Force is the predominate service in the development and extension of space as a medium guaranteeing freedom of action for the United States and its allies. The Under Secretary of the Air Force for Space, the Hon. Peter B. Teets, and the Commander of AF Space Command, Gen Lance W. Lord, acknowledge our rapidly increasing dependence on space technologies and capabilities, as well as their associated utility as a joint/coalition force multiplier. The author believes that the natural military evolution of what could be termed an American asymmetric trump card will eventually necessitate its development as a separate service.

Additionally, space is a distinct medium which respond to different laws of physics than those applying to air, land and sea. The author's supposition is that for the United States to maintain its dominance in space, while benefiting from the growth of its synergies, its leaders must develop the plan now and coordinate for its execution. This represents a proactive

approach to development of national strategic initiatives unlike the example of the era leading up to the 1947 separation of the Air Force from the Army.

As the only truly global super power, the United States must develop the plan now to embrace its responsibilities in space as completely as they do those in all other mediums.

CHAPTER 2

STATEMENT OF THE PROBLEM

We are nearing the end of mankind's bloodiest century. Through enormous sacrifice, America has preserved its own freedom and has freed millions around the world. As leaders, we must seek an Apollo-like commitment from the American people. We must ask them again to reach into space with gusto—for its science, its mystery, and the security it can offer us. Control of space is more than a new mission area—it is our moral legacy, our next Manifest Destiny, our chance to create security for centuries to come.

Sen Bob Smith, The Challenge of Space Power 1999

...the US Government—in particular, the Department of Defense and the Intelligence Community—is not yet arranged or focused to meet the national security needs of the 21st century. Our growing dependence on space, our vulnerabilities in space and the burgeoning opportunities from space are simply not reflected in the current institutional arrangements...we know from history that every medium—air, land and sea—has seen conflict. Reality indicates that space will be no different...the US Government must play an active, deliberate role in expanding and deepening the pool of military and civilian talent in science, engineering and systems operations that the nation will need.

Commission to Assess US National Security Space Management and Organization 2001

The cementing of space superiority for the US and her allies is critical to its position as a global leader in the twenty first century. This is uncontested. How this should be accomplished is the real question. In the years immediately following the end of the Cold War, the US began to draw down its monolithic armed forces. However, it simultaneously increased its global commitment to relative levels previously unseen. The United States armed forces are a mission-focused, combat-proven, decisive fighting force...leveraging the strengths of all components to optimize total force effectiveness in peace as well as war across the full spectrum. This proven

combat capability remains superior to all potential adversaries. The real and quantifiable threat America faces is not currently from a near-peer competitor, but from a potential aggregate of foes. Therefore, assuring security and stability requires continual global vigilance, reach and power; global vigilance to anticipate and deter threats, strategic reach to curb crises and overwhelming power to prevail in conflicts and America's wars. To deal with the changing worldwide polarities, while effectively managing our operational forces, the military emphasized returning to its expeditionary roots in order to provide joint force commanders with comprehensive force capabilities. This was meant to meet the spectrum of contingencies--ensuring situational awareness, freedom from attack, freedom to maneuver and freedom to attack.

As a congressman, Senator Smith sat on the Space Subcommittee of the Science and Technology Committee where, over the space of five years, he honed his knowledge and vision about America's future in space. (Smith, 1) His point of departure is built on three assertions: "(1) America's future security and prosperity depend on our constant supremacy in space; (2) although we are ahead of any potential rival in exploiting space, we are not unchallenged, and our future dominance is by no means assured; and (3) to achieve true dominance, we must combine expansive thinking with a sustained and substantial commitment of resources and vest them in a dedicated, politically powerful, independent advocate for space power." (Smith, 1-2) Senator Smith's position of leadership enabled him to more fully understand this evolving mission area and medium and resulted in a clearly articulated vision for many of the steps America should consider in order to protect its investment. His call for study, funding and advancement could easily be seen as the catalyst for the Space Commission.

The 2001 Commission to Assess United States National Security Space Management and Organization, better known as the Space Commission, researched and scoped the impact of space today and its projected impact in the future. They defined US national military, technological, intelligence, and economic objectives with respect to space. (Commission, iii-vi) They clearly outlined our systemic weaknesses, making recommendations throughout, and ending with a series of five unanimous conclusions which could prove critical to our influence in, through and from space. (Commission, 100) As the last official space policy statement was published in 1996, the author accepts the commission's report as the definitive governmental work addressing current US space policy. Their point of departure is similar to that of Senator Smith: "The Commission unanimously concluded that the security and well being of the United States, its allies and friends depend on the nation's ability to operate in space. Therefore, it is in the US national interest to: promote the peaceful use of space...use the nation's potential in space to support its domestic, economic, diplomatic and national security objectives...develop and deploy the means to deter and defend against hostile acts directed at US space assets and against the uses of space hostile to US interests." (Commission, vii)

While the nation's current space leadership has developed a roadmap that will help the US embrace its potential, they, unlike Senator Smith, have stopped short of recommending a separate space service at this time. The author will explore their logic and reasoning later within this text. (Commission, 80) The author proposes that a separate Space Service may eventually need to be created to effectively meet our rapidly emerging national security needs (and national interests) by completely developing our space borne offensive and defensive capabilities. The issues highlighted by the commission would be more successfully addressed if the national

security end state was comprehensively outlined and the organizational plan of attack (objectives) defined in order to ensure the desired effects are achieved.

As mentioned above, the commission's five conclusions were unanimous. Even more so than their presuppositions, their conclusions very closely mirror the case made previously by the learned Senator Smith, and renew the call for urgency in stewardship for, in, and through space. Though not going so far as to call space our next Manifest Destiny, the Commission clearly articulates our "Manifest Responsibility" as the nation most heavily dependent on space and the most vulnerable to the loss of access. They emphasized that these were "matters of key importance that we believe need attention quickly from the top levels of the US Government." (Commission Report, 99)

Undoubtedly the unanimous mandate given to our national leadership provides a demarche of sorts. The current emphasis and vision must transform if the United States is to maintain its position as the preeminent space faring nation; a nation that is able to preemptively impact its destiny rather than becoming one which is only able to react to the conditions set by others. Indeed, the president has been very clear about the role he expects this country to take in the world.

Initially insular in its outlook, America has gradually transitioned, in many ways, into an outward-looking nation. The strongest national impetus, uniquely American, is a sentiment directing us to resist becoming entangled with permanent commitments in the foreign world.

This position represents one of the most influential international policies in this country's short history. In fact it reaches across the centuries as the point of departure/rubric for Americans responsible for this nation's security. Although, there have been others, some critical, few have been so seemingly absolute.

Historically, whenever a vulnerability threshold has been critically breached, this country has looked beyond its immediate internal concerns to affect its will on the world around it in order to maintain its national security. Several of America's most memorable forays into international conflict have developed haltingly and only after extensive measures to avoid becoming entangled. (e.g. WWI, WWII, etc.) The irony is that, with respect to global vice regional stability/security, as goes the United States, so goes the rest of the world. In order to be most effective, the United States must be proactive. In the quote below, Gen MacArthur rightly admonishes the reader to escape their paradigms and look for success where it might be found, as opposed to where one hopes it may be.

New conditions require for solution—and new weapons require, for maximum application—new and imaginative methods. Wars are never won in the past.

Gen Douglas MacArthur

Today, however, as the US embraces its position of global leadership, it acknowledges its acceptance that its strategic security is inextricably enmeshed with that of its allies, and in many cases, with those who are not currently allies. Key examples of this are found in Europe and the Middle East. The president recently expressed his great appreciation for Prime Minister Tony Blair and the British support for the global war on terrorism. Key to his (Pres Bush's) support

for Mr. Blair was the public acknowledgement that America recognizes that lasting peace in the Middle East is tied to a credible solution to the on-going Israeli-Palestinian conflict. Taking this position publicly helps assure allies and others that America is not just focused on its own immediate security concerns, but also those important around the world. (There is also some level of secondary benefit resulting from a redirection of domestic and international focus from other difficult areas of concern.)

This new position substantively and permanently departs from the previously well established pattern wherein this country remains insular and inward looking until it is forced to act to preserve and/or protect domestic and international balance/security. Traditional US international and socioeconomic stratagems left major areas of the world to fend for itself unless some immediate threat could be identified. Even the Truman doctrine, which could be seen as somewhat altruistic, was only used to buttress American concerns and not to create substantive change. The author believes that if America fully comprehends and embraces the potential impact of leveraged space capabilities, it will set the conditions for its future national security as well as that of its allies. If it fails to do so, it leaves unleveraged an area of unparalleled asymmetric advantage, and it simultaneously yields the initiative. Somerset Maugham's words from the last century ring true and serve to convict America's traditional insular nature.

If a nation values anything more than freedom, it will lose that freedom; and the irony of it is that if it values comfort or money that it values more, it will lose that too.

Somerset Maugham

President Bush's fresh articulation of America's new posture statement is challenging, because America appears to define freedom and the duty of other nations worldwide. It indicates that the Commander in Chief does not intend to yield the initiative. This is further amplified by the president's clear commitment to follow his words with supporting actions, while he counters fears of American brashness. President Bush outlines America's determination not to use its instruments of national power for unilateral advantage but rather to create a balance of power to defend, preserve and extend the peace (which he defines as freedom, democracy, development, free markets and trade) on every continent. (NSS, i) In order to do that, the US must be prepared and willing to oppose global enemies of peace wherever they may be found...including space. Although preparing for potential the weaponization of space brings out issues which may not be easily addressed or resolved, that is the course America should take. If it is assessed America may face a future challenge in, from, or through space, then America would do well to prepare, proactively, to meet the challenge.

The first, the supreme, the most far-reaching act of judgment that the statesman and commander have to make is to establish by that test the kind of war on which they are embarking; neither mistaking it for, nor trying to turn it into, something that is alien to its nature. This is the first of all strategic questions and the most comprehensive.

(Clausewitz, 100)

Nested within his larger vision of positive global engagement, is the president's articulation of America's defense posture as it applies to the world today, as well as, to the global war on terrorism. In what is commonly recognized as the Bush Doctrine, the American policy of preemption forwards that the US will act against emerging transnational threats before they are fully formed. (NSS, ii) It goes on to stipulate that while the US welcomes and encourages

freedom, it will “strongly resist aggression from other great powers.” (NSS, ii) Alternatively, the US will extend freedom as a counterbalance to the endemic effects of combining weak states with internal poverty and corruption which mixes to foment an environment that fosters the growth of unrest and terrorists. (NSS, ii) In fact America’s global military and economic dominance is unlike any other in the history of the world. (Donnelly, 1-2) Two powerful statistics solidify this point; although the US represents approximately five percent of the world’s population, it creates about thirty percent of the world’s total economic product; also, the US military arm is unrivalled and un-offset, by any other near-peer competitor, unlike the conditions present during the height of the Roman and British empires. (Donnelley, 2-3) Therefore, the Bush doctrine truly has global ramifications which must be accounted for: “The United States possesses the means—economic, military and diplomatic—to realize its expansive geopolitical purposes. Further, and especially in light of the domestic political reaction to the attacks of September 11, the victory in Afghanistan and the remarkable skill demonstrated by President Bush in focusing national attention, it is equally true that Americans possess the requisite political willpower to pursue an expansive strategy.” (Donnelly, 3) If this is to be believed, now is a key time for the United States to convert and extend the power of the President’s vision to strategy for the development of space power.

To America’s military leadership, the Bush doctrine clearly communicates the commander’s strategic intent; to America’s allies, it clearly communicates US strategic direction; to America’s enemies, it clearly communicates US strategic determination and commitment. To maximize effectiveness, the joint planner must understand the implications of the president’s message as it is transmitted to and received by all parties.

Victory smiles upon those who anticipate the changes in the character of war, not upon those who wait to adapt themselves after the changes occur.

Gulio Douhet

To present an ordered plan with which the United States can structure its future with respect to the use, development and protection of outer space, and all of the advantages a leveraged relationship provides, the author will utilize the deliberate planning process to address the background and foundational focus for maximizing the development of the military instrument of power. There are several major steps which require the author to use open source data in order to facilitate the process. Should follow on study be authorized, higher classifications of information and intelligence could be definitively resourced and initial benchmarks leveraged to integrate a plan for the development of space power across all instruments of national power.

While this could be considered an untraditional approach to meeting the research requirement in a rigorous area of academic study, the author found it not only appropriate but indeed required. Based on the design and focus of the Joint Advanced Warfighting School, to build world-class joint campaign planners, this method performs the dual functions of providing an in depth look at a strategic/operational problem while emphasizing the skills organic to the curriculum and the joint environment. While it is accepted that the United States should accept a leading role in the development, use and protection of space, it is not as clear which method the country should embrace in order to make the vision a reality. The deliberate planning process is an excellent mechanism to facilitate the articulation of the road ahead. From mission analysis to course of action development, analysis and selection, this method of problem identification and

solving has been based on a time proven model; the military decision-making process. Due to certain programmatic/organic limitations, and the desire to remain unclassified, the breadth and depth of information necessarily constrains the experiment. While this prevents completed strategic development, it thoroughly exercises the process, satisfying the research requirement while reinforcing the operational/strategic planning curriculum.

This effort also provided the author the opportunity to create a functional skeleton of the first two phases of the deliberate planning process. (See Appendix A) While not drafted as a template, it will, nonetheless, serve as a comprehensive and useful outline from which one could craft their plan of action, while monitoring their progression through the decision making model. Additionally, the author took the opportunity to assemble a set of initial definitions that space planners might find useful as they establish a common lexicon and frame of reference. (See Appendix B)

CHAPTER 3

DELIBERATELY PLANNING FOR THE DEVELOPMENT OF THE MILITARY INSTRUMENT OF POWER IN SPACE

The gravest danger our Nation faces lies at the crossroads of radicalism and technology. Our enemies have openly declared that they are seeking weapons of mass destruction, and evidence indicates they are doing so with determination. The United States will not allow these efforts to succeed. We will build defenses against ballistic missiles and other means of delivery. We will cooperate with other nations to deny, contain, and curtail our enemies' efforts to acquire dangerous technologies. And, as a matter of common sense and self-defense, America will act against such emerging threats before they are fully formed. We cannot defend America and our friends by hoping for the best. So we must be prepared to defeat our enemies' plans, using the best intelligence and proceeding with deliberation. History will judge harshly those who saw this coming danger but failed to act. In the new world we have entered, the only path to peace and security is the path of action."

The National Security Strategy of the United States Preamble, ii

Deliberate planning is conducted primarily in peacetime and prepares for possible contingencies based upon the best available information, using forces and resources apportioned for deliberate planning. These plans rely on assumptions regarding political and military circumstances that are likely to exist upon implementation of the plan.

Joint Publication 5-00.1, III-5

Deliberate planning provides the baseline for the orderly development of a strategic/operational plan of action constructed to address a particular problem. The first step in the process is called Initiation. In this step several national level documents, including the Joint Strategic Capabilities Plan (JSCP), the Unified Command Plan and the Theater Security Cooperation Guidance etc., serve as source documents to outline peacetime planning tasks. They

specify planning guidance for the combatant commander, while apportioning military forces and resources available. They may also contain the genesis for several elements of campaign design; the strategic guidance, critical factors and the operational concept. Unity of effort and determining responsibility along the seams are unique challenges, when accounting for space considerations and priorities. An orderly development of the issues outlining space power and the requirement to develop it can be achieved through the deliberate planning process.

The expanded military decision making process is encompassed, primarily, within the first two phases of deliberate planning. (See Appendix A) It begins with initiation, continues through the associated joint intelligence preparation of the battlespace and ends after the course of action has been analyzed and selected near the end of the concept development phase. Many of the normal documents and mechanisms used in this process were not available, so clarity in national strategic guidance and/or direction was extrapolated from the Space Commission Report and other documents consistent with overall US national security policy.

CHAPTER 4

INITIATION

We are entering an era—if we have not already entered it—when the use of space will exert such an influence on human affairs that no nation can be regarded as a world power or remain a world power unless it possesses significant space capabilities.

Gen Robert T. Herres, Former CINCSPACE (M. Smith, 57)

The first and arguably most important step in the deliberate planning process is to accurately determine and outline the mission to be accomplished. In order to do this the objectives must be identified and the tasks required to achieve them must be delineated. These describe/encompass the many high level tasks, like providing for the national security of the United States. This is also where national agencies confirm national priorities with respect to level of resourcing available to regional combatant commanders. It would also be appropriate to identify specific space flexible deterrent options (FDOs) along with others from the DIME model (**D**iplomatic, **I**nformational, **M**ilitary, and **E**conomic instruments of national power) in order to focus the planning effort.

For the purposes of this endeavor, the Commission to Assess United States National Security Space Management and Organization (Space Commission Report) will serve as the primary source document for national direction. While there are other documents available, they are somewhat dated. In the author's opinion, the Space Commission Report is the most comprehensive governmental document currently available for planning. Its research and investigative effort was led primarily by the current Secretary of Defense and has been accepted as providing a way ahead or strategic roadmap for this country. Their unanimous conclusions

offer critical insight into what can be called strategic guidance. The commission was also unanimous in its final opinion that not only the national security of the United States, but also that of its allies, was dependent on the America's ability to leverage its space capabilities. (Space Commission Report, vii) They outlined the national strategic interests by jointly defining mission areas with the following national direction (Space Commission Report, vii);

- “Promote the peaceful use of space
- Use the nation's potential in space to support its domestic, economic, diplomatic and national security objectives
- Develop and deploy the means to deter and defend against hostile acts directed at US space assets and against the uses of space hostile to US interests”

The last aspect for the development of national strategy and direction comes from the unanimous conclusions the commission forwarded as a blueprint for the future development of space power.

1. “First, the present **extent of US dependence on space**, the rapid pace at which this dependence is increasing and the **vulnerabilities it creates**, all demand that US national security space interests be recognized as a top national security priority. The only way they will receive this top priority is through specific guidance and direction from the very highest government levels...to **ensure that the United States remains the world's leading space-faring nation...**” (Space Commission Report, 99)

The first conclusion highlights the fact that the US leads the world with regard to all things space. It emphasizes that because America is very dependent on space, which brings with it multiple vulnerabilities which have specific and collective national security implications. Its declaration requiring specific strategic guidance and direction accentuates the absence of a

comprehensive national security strategy. It also validates the requirement to address this deficiency:

2. “Second, the US government—in particular, the Department of Defense and the Intelligence community—is **not yet arranged or focused** to meet the national security space needs of the 21st century. Our growing dependence on space, our **vulnerabilities in space and the burgeoning opportunities from space** are simply not reflected in the present institutional arrangements. After examining a variety of organizational approaches, the Commission concluded that a number of disparate space activities should promptly be merged, chains of command adjusted, lines of communication opened and policies modified to achieve greater responsibility and accountability. Only then can the necessary trade-offs be made, the appropriate priorities be established and the opportunities for improving US military and intelligence capabilities be realized. **Only with senior-level leadership, when properly managed and with the right priorities**, will US space programs both deserve and attract the **funding that is required.**” (Space Commission Report, 99)
3. Third, **US national security space programs are vital to peace and stability**, and the two officials primarily responsible and accountable for those programs are the Secretary of Defense and the Director of Central Intelligence. Their relationship is critical to the development and deployment of the **space capabilities needed to support the President in war, in crisis and also in peace.** They must work closely and effectively together,

in partnership, both to set and maintain the course for national security space programs and to resolve the differences that arise between their respective bureaucracies. Only if they do so will the armed forces, the Intelligence Community and the National Command Authorities have the information they need to pursue our deterrence and defense objectives successfully in this complex, changing and still dangerous world.” (Space Commission Report, 99)

The second and third conclusions clearly accentuate the weaknesses identified in the first. Additionally, they articulate that the Department of Defense is not arranged or focused to meet the country’s national security space needs. The natural follow on recommendation is for senior leaders to craft the national direction effectively enough to garner appropriate funding levels:

4. Fourth, we know from history that every medium—air, land, and sea—has seen conflict. Reality indicates that space will be no different. Given this virtual certainty, the **US must develop the means both to deter and to defend against hostile acts in and from space. This will require superior space capabilities.** Thus far, the broad outline of US national space policy is sound, but the US has not yet taken the steps necessary to develop the needed capabilities and to maintain and ensure continuing superiority.” (Space Commission Report, 99)

Conclusion number four holds the most critical implications for the defense community. Funding notwithstanding, this conclusion acknowledges that space is a medium that will inevitably play host to conflict. As yet, America does not have the means or capabilities to deter or defend its interests in, through or from space:

5. Finally, the **investment in science and technology resources**—not just facilities, but people—**is essential** if the US is to remain the world’s leading space-faring nation. The US Government needs to play an active, deliberate role in expanding and deepening the pool of military and civilian talent in science, engineering and systems operations that the nation will need. The government also **needs to sustain its investment in enabling and breakthrough technologies in order to maintain its leadership in space.**” (Space Commission Report, 99)

The last conclusion simply dictates that the US Government must, after outlining the national vision, fully resource it. The commission recognizes the imperative to maintain leadership by planning for successful growth and development.

The strategic imperative and the conclusions, listed above, represent the major tasks and planning guidance required to provide direction for the entire effort. There are several additional areas which can be addressed during the initiation stage. Forces and resources apportioned or available for planning are normally identified in the Joint Strategic Capabilities Plan. As per the space commission report conclusions, space resources are not yet arranged or organized on par with other forces charged with ensuring our national defense.

After outlining the strategic guidance, the next most important step in the process is the Joint Intelligence Preparation of the Battle Space. The launching point for planning depends on how well the staff is able to define the environment, its requirements, and potential effects.

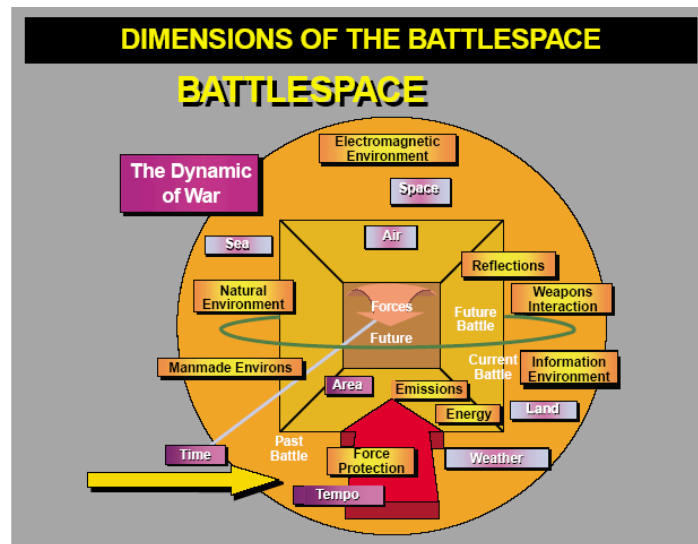
CHAPTER 5

JOINT INTELLIGENCE PREPARATION OF THE BATTLESPACE

Space is a realm in which many military operations are conducted more efficiently than by terrestrial systems. Military satellites have been operating in space for more than twenty years, and our accomplishments in DESERT STORM emphasize that space has unquestionably evolved as a military theater of operations.

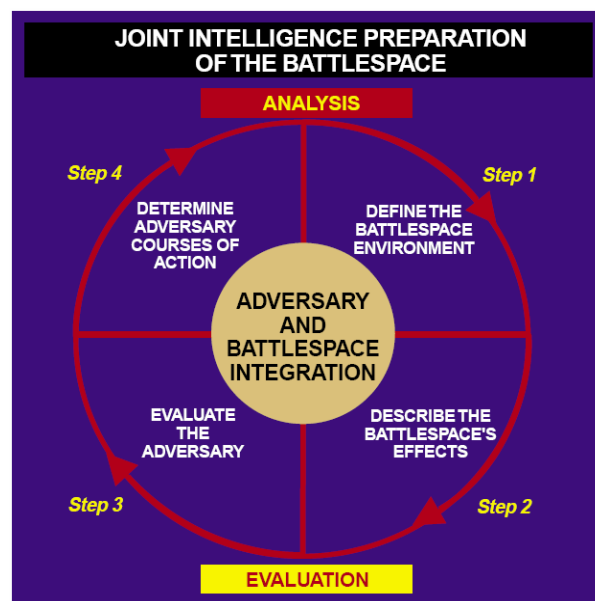
*Gen Charles A. Horner, CINCSPACE (CENTAF/CC for DESERT SHIELD/STORM),
Testimony before the Senate Armed Services Committee, 22 Apr 93*

Closely following the initiation of the planning process is the research and development of the strategic, operational, and tactical environments called the Joint Intelligence Preparation of the Battle space or JIPB. This critical step provides much of the foundation for the rest of the process by providing comprehensive and in depth background along with predictive intelligence to decision makers. (JP 2-01.3, I-1)



(JP 2-01.3, I-2)

JIPB provides the basis for all sequential and simultaneous planning operations by supplying background information and predictive intelligence required to assist the Joint Force Commander in operating inside of the enemy's decision cycle. (JP 2-01.3, I-2) In fact, joint forces will "evaluate the battle space environment and adversary in a wide variety of situations across the full range of military operations." (JP 2-01.3, I-2) Using a macro-analytic approach, JIPB identifies the enemy's probable intent, his national and operational strategy and probable intent across all dimensions of the battle space. (JP 2-01.3, I-2-4)



(JP 2-01.3, II-1)

Understanding the operating environment is critical because everything else depends upon successfully and comprehensively completing this step; accurately outlining issues and characteristics which could influence the JFC and component commander's decision making process. (JP 2-01.3, II-2) The first requirement is to understand the area of responsibility.

Clearly defining the area of responsibility identifies the supported commander, areas for deconfliction as well as potential seams requiring resolution.

Space, to a large extent, is an unknown to many throughout our country and to many leaders in our government who are being asked to make critical decisions that will chart the course of space for the United States—both inside and outside the military.

Gen Howell M. Estes, Former CINCSPACE (M. Smith, 1)

AREA OF RESPONSIBILITY

The outer space environment is different than any other. It is the only one that covers the entire earth without the international boundaries that impact every other medium. (Sea, Air and Land) Per Joint Publication 3-14, Joint Doctrine for Space Operations, these differences are in represented in three major categories (JP 3-14, I-2):

- **No Geographical Boundaries.** Accepted international conventions do not extend a nation's geographical boundaries into Earth orbit. Therefore, nations enjoy unimpeded satellite overflight of other nations through space. Operating from space provides line of sight (LOS) access to large areas (including remote and denied access areas), which offers advantages for communications, navigation, meteorology and oceanography, and intelligence, surveillance and reconnaissance (ISR).
- **Motion not Affected by the Earth's Surface.** Spacecraft movement is not significantly impeded by any of the Earth's surface features (such as terrain), but instead is primarily governed by orbital mechanics. **Satellites in space move at high velocity with minor retarding forces**, thereby allowing them to remain in orbit for extended periods of time (i.e., years).
- **Unique Characteristics.** As with land, sea and air, space has unique physical characteristics. The **space environment affects both terrestrial and space systems**. The space environment affects the performance of military, commercial, and civil systems in space, air, land and sea (e.g., radar, communications, ISR systems). Solar flares and other natural phenomena in space create storms and atmospheric changes that can interrupt

communications, cause electronic failures, and reduce performance of sensors and communications.

The physical differences between the air and space environments are accepted as real and quantitatively definable. In outer space, there is no atmosphere, rather it exists as a vacuum flooded with meteoroids, micrometeoroids, and high energy particles juxtaposed with one another through fluctuating magnetic fields. (Rife, 2) “The motion of bodies in orbit closely follows the laws of celestial mechanics, a much different system of knowledge than the laws of aerodynamics governing the flight of aircraft. Aircraft operate in the much more benign environment of Earth’s atmosphere, characterized by moisture, wind, precipitation and pressure.” (Rife, 2)

Historically military forces have sought the high ground in order to gain a positional advantage over their adversaries. Traditionally, if one could leverage the benefits of their dominant geography, they had a better than average chance of winning the fight. Space forces represent the new high ground and fully understanding what that means is the precursor to being able to fully leverage that the combat power being exercised in, through and from that theater. “Operating high above the Earth’s surface, satellites can “see” deep into an adversary’s territory, with little risk to humans and machine. Today, control of this high ground means superiority in information and significant force enhancement. Tomorrow, ownership may mean instant engagement anywhere in the world.” (AFDD 2-2, 1-2) Another way joint strategists/leaders define their limits is by articulating additional parameters and uses in the lexicon of joint doctrine, service doctrine and other published efforts which are doctrinal in nature.

JIPB JOINT DOCTRINE

There is a school of thought, primarily within the Air Force, that posits that air and space are a continuum. That, despite any physical differences a clear dividing line between the two mediums does not exist in the same way it does between the sea and air, the land and sea etc. The current position of the Air Force is that the two are conjoined with out the “distinction in boundaries...we leverage the strengths of our...platforms throughout these realms to produce the exact effects our nation needs.” (AFDD 2-2, 2) The Air Force further supports its position by defining space superiority similarly to the way it does air superiority, but the logic does not hold. “Space, air, and information superiority are mutually supporting objectives. It is extremely difficult to maintain one without the others and the value of one is greatly enhanced when accompanied with the others.” (AFDD 2-2, 3) When viewed through a support or proximity paradigm this view could sound as limiting as the ground centrists who could only envision air operations insofar as they augmented the ground mission/objective.

There is no division...between air and space. Air and space are an indivisible field of operations.

General Thomas D. White USAF Chief of Staff, 1957 (AFDD 2-2, 1)

When crafting the tenets designed to underlay air and space power, the AF doctrinal tome reminds planners and operators not to assume that air power and space power are interchangeable. However, “...applying the operational art of war requires an understanding of the similarities and unique qualities of each, and combining these capabilities in the right mix for desired effect.” (AFDD 2-2, 8) They followed this position by “overemphasizing” the similarities between air and space power without sufficiently exploring the breadth and depth of

their differences. Characteristics are addressed as an extension of, or additive to, the air effort. Moorehead takes this further as he opines, “The Air Force needs an institution where space operators can debate space power theory and doctrine. Instead of establishing such an institution, the Air Force has taken traditional air power terms and applied them to space: ‘air superiority’ led to ‘space superiority’; ‘counter air’ led to ‘counter space’; and ‘airlift’ led to ‘space lift.’ No space power theory and doctrine exists separate and distinct from air power theory and doctrine. Space power doctrine should not be based on air power doctrine anymore than air power doctrine should be based on land power doctrine.” (Moorehead, 51)

If the Air Force clings to its ownership of space, then tradeoffs will be made between air and space, when in fact the tradeoff should be made elsewhere.

Gen Horner, 1997, CINCSPACE (Smith, 8)

Another writer expands on Moorehead’s view by concluding that “one cannot build space power theory and doctrine in general upon airpower theory and doctrine. Theories and doctrines of airpower, land power, and sea power may contribute significantly to the development of the theory and doctrine of space power, but space power clearly requires fundamental, bottom-up, theoretical and doctrinal development.” (Rife, 2)

In an absence of doctrine, it is useful to examine how to create the doctrinal foundations required for organizational excellence in execution. “Generally, doctrine comes from three sources: actual wartime experience, theory, and war games/exercises.” (Rife, 8) Obviously new doctrine based on wartime experience carries a very high risk, as one uses unproven strategy and tactics. The penalty as one moves upwards along the learning curve’s continuum is generally

paid in loss of life and systems. In the case of space, there is still relatively little data to extrapolate from for future use. (Rife, 8) The diametric opposite would call for the professional to craft his new doctrine entirely from theory. As such, the planner would effectively be basing his doctrinal construct on conjecture, and without evidentiary support from current or historical combat or combat-like conditions. Theory has a place, but it is best used in conjunction with, rather than in place of, empirical evidence. (Rife, 8) Rife believes that ultimately, military professionals can gain required insight and standardization through realistic models, simulations and war games, based on derived lessons learned. This is the best option due to the additional benefit of capturing real data without putting lives at risk. (Rife, 8)

Our progress in space over the last 50 years has made the world a much smaller place. We now take for granted the nearly instantaneous global telecommunication, precise navigation, environmental monitoring, and threat warning and assessment that space systems provide. As we continue to increase our reliance on these systems, space has become vital to our nation's strength and prosperity. We must understand that while we promote the peaceful use of outer space, our nation expects our Air Force to fully exploit and defend it.

Gen John P. Jumper, USAF Chief of Staff (AFDD 2-2, Foreword)

JOINT OPERATIONS

Although not enough to support complete generation of a new class of space doctrine, there is a mounting body of evidence increasingly expanding the lessons learned as space becomes more thoroughly imbedded in American wartime operations. In fact the Commander of Air Force Space Command observes, “Today, our integrated team of dedicated space professionals and the space and missile capabilities they bring are essential to any fight and, maybe more importantly, to deterring conflict before it begins.” (Lord A&SPJ, 11) Asymmetric

advantages are increasingly attributed to those who align themselves against the United States. In the case of America's burgeoning space capabilities, the pendulum of asymmetric advantage can be seen swinging overwhelmingly in our favor. It is therefore incumbent upon us to guard this tremendous advantage / high ground and not allow it to become an unprotected critical vulnerability. Gen Lord focused on this exact concept when he remonstrated that, "Future adversaries understand the importance of space and the advantage it offers our forces. We have to assume that those same potential adversaries are developing methods to challenge our capabilities. We have enjoyed a period of unchallenged dominance in military space that has enabled our success since Desert Storm. Our jobs would become much easier if we could expect this trend to continue, but we would be living a dream." (Lord A&SPJ, 11)

The supported commander for space operations has a tremendously broad and evolving area of responsibility. There are multiple potential seams as well as unconventional challenges for the entire theater. This environment is so different, as indicated earlier, that while primacy may be more easily assigned to a COCOM for space, the solutions for seam coverage and supported/supporting relationships will require focused and aggressive problem solving / solutions sets. The joint force mission and JFC's intent are integrated to help focus the results of the JIPB development process and to maximize the utility created through mission analysis.

CHAPTER 6

MISSION ANALYSIS

How the US develops the potential of space for civil, commercial, defense and intelligence purposes will affect the nation's security for decades to come.

(Space Commission Report, 27)

Today, space power represents a decisive, asymmetric advantage for the US Government...the successful application of space capabilities has enabled significantly changed concepts of power projection, decisive force, overseas presence, strategic agility and forcible entry. The successful application of space power has fundamentally changed our view of the age-old military precepts about mass, movement, fog and friction. (Teets, A&SPJ, 5)

The initial focus, of this step, is on defining the objective. A principle of war, objective, calls for military professionals to direct their efforts towards a clearly defined, decisive and attainable objective. (Joint Publication 3-0, A-1) All efforts, across the instruments of national power, must work together to achieve the objective, and if they do not contribute to that end, those actions must be reevaluated. (JFSC Pub 1, 3-15) Extrapolated from the objectives outlined during Initiation, one can glean that the National Command Authorities' direction is to take such steps as required to maintain America's preeminence as the world's superpower. Military application flows from each of these potentially unlimited national strategic objectives, and the military end state is one in which the United States maintains freedom of action in space. These will be further articulated through operational application of the principles of war, as well as facets of the operational art and design.

The next responsibility requires the joint planner to identify and define the tasks required to meet the objectives. The three types of tasks are mission essential, specified and implied.

Mission essential are those that are required or the result is mission failure. Specified tasks are those that are specifically directed to be accomplished, and implied tasks are those associated tasks one determines as necessary in order to satisfy the specified and mission essential tasks.

(JP 5-00.1, III-5)

The Space Commission directive highlighted in the Initiation stage cemented the criticality of this nation gaining and maintaining significant space operational capabilities. They tied this to US national strategic interests by focusing on the following key areas which will serve as the foundation of this planning effort and serves as the point of departure for the eventual derivation of tasks etc.:

- Promote the peaceful use of space
- Use the nation's potential in space to support its domestic, economic, diplomatic, and national security objectives
- Develop and deploy the means to deter and defend against hostile acts directed at US space assets and against the uses of space hostile to US interests

(Space Commission Report, vii)

For the further development of US space power the plan must be anchored to a central point from which all other efforts should gain their focus. This is the primary objective:

NATIONAL SPACE OBJECTIVE

“The nation's leaders must assure that the vulnerability of the United States is reduced and that the consequences of a surprise attack on US space assets are limited in their effects.” (Space

Commission Report, ix)

The mission essential task focuses on the one thing that must occur in order to have overall mission success.

MISSION ESSENTIAL TASK

To “employ space systems to help speed the transformation of the US military...to deter and defend against evolving threats directed at the US homeland, its forward deployed forces, allies and interests abroad and in space.” (Space Commission Report, vii)

There were several tasks that were specifically assigned to civilian and military leaders:

SPECIFIED TASKS

1. To “develop revolutionary methods of collecting intelligence from space to provide the President the information necessary for him to direct the nation’s affairs, manage crises and resolve conflicts in a complex and changing international environment.” (Space Commission Report, vii)
2. To “create and sustain within the government a trained cadre of military and civilian space professionals.” (Space Commission Report, viii)
3. To “invest in technologies to permit the US government to field systems one generation ahead of what is available commercially to meet unique national security requirements.” (Space Commission Report, viii)

As described above the last task area includes those tasks that are implied:

IMPLIED TASKS

1. “Shape the domestic and international legal and regulatory environment for space in ways that ensure the US national security interests and enhance the competitiveness of the commercial sector and the effectiveness of the civil space sector.” (Space Commission Report, viii)
2. “Promote government and commercial investment in leading edge technologies to ensure that the US has the means to master operations in space and compete in international markets. (Space Commission Reports, viii)

3. “The US must develop and maintain intelligence collection capabilities and an analysis approach that will enable it to better understand the intentions and motivations as well as the capabilities of potentially hostile states and entities.” (Space Commission Report, viii)

These tasks serve to focus the governmental effort with respect to the development of space power. The mission statement is the central statement, used by all, to ensure unity of effort in pursuit of objectives. It is formed by the junction of the mission essential task with the purpose.

MISSION STATEMENT

On order, create a transformational capability in order to deter enemy aggression against space systems in, through, and from space. If deterrence fails, America must defeat aggressors in order to protect global stability, the US homeland, its forces, allies and vital national interests.

APPORTIONED FORCES

This study will not go in depth outlining the current types, and allocations of organic military forces generated for planning and/or execution. It is useful, however, to consider the focus of DoD’s largest space-focused organization, Air Force Space Command.

As our nation’s dependence on space capabilities grows, it is critical that we create and then develop a cadre of space warriors who are equally skilled in operational art and technical expertise. Military space operations must have a depth of technical and operational expertise...in order to face increased and even more uncertain threats than our nation confronted during the Cold War. These lessons from the past, when coupled with the uncertain threats looming in the dynamic and changing security environment of the twenty-first century,

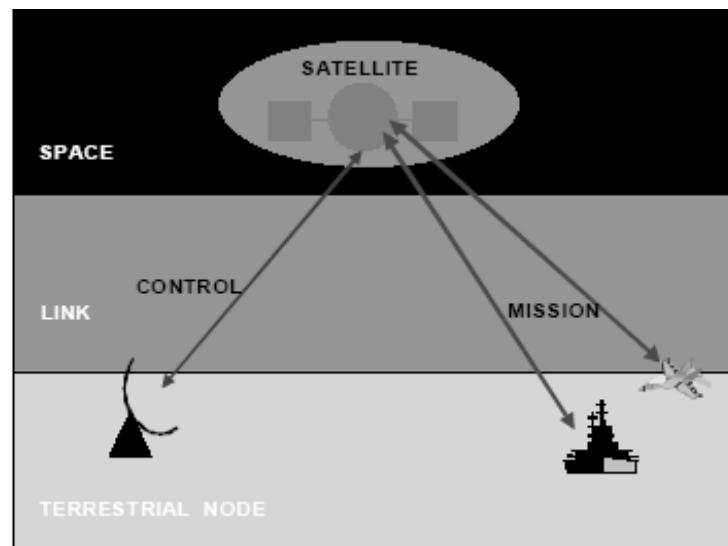
necessitate a change in focus for military space operations: ‘Defending the United States of America through the control and exploitation of space.’ (Lord A&SPJ, 12-13)

Gen Lord’s focus is to morph AFSPC into the organization invested with the depth of operational foresight and technical expertise required to address the threats facing our country. (Lord, A&SPJ 12) It is apparent that his vision for the future, “to become a full-spectrum space-combat command” is comprehensively scoped to be able to handle the spectrum of the anticipated threat to the country for the entire Department of Defense. (Lord, A&SPJ 13) Underpinning that statement is the understanding, the point of departure, that “space capabilities are inherently global in nature and joint...” (Lord, A&SPJ 13) In short, he is clearly building a capability that more closely approximates service-level responsibility than that of a major command. He is basing this in part on his charter for military space operations “Defending the United States of America through the control and exploitation of space.” (Lord, A&SPJ 13)

US CENTER OF GRAVITY

Space and space-based capabilities are now incredibly interwoven into the fabric of American functionality, commercial, civil and military. As mentioned earlier, this is as unquestioned as is America’s position as global leader in all things space. The center of gravity therefore is the United States military space architecture. The critical capabilities which allow the government to operate effectively are the US commitment to Space, the ability to leverage emerging technologies, and the capability to support operations, in through and from space. (Space Commission Report, xi) In order to support the critical capabilities, there are several critical requirements that bear identification. Communication, transportation, education, and

multiple military applications are four of the primary requirements that drive US commitment to space. In order to maintain this drive, America must develop a coherent space security strategy and continue to fund space-dependent systems that the people believe in. Additionally, in order to ensure that the American people stay informed and willing to support increased levels of commitment, an effective Information Operations plan is an important part of the overall plan.



Space System Elements (AFDD 2-2, 3)

Within the previously identified critical requirements, there are several critical vulnerabilities which we must be able to protect from negative influence and/or attack. Ground stations, commercial links, finite bandwidth and competing interests for funding sources all fall into this category. (See Space System Elements Figure above) An adversary can attack any of the nodes or links to degrade our ability to conduct operations. In fact, “today’s threat spectrum includes terrorist attacks on ground stations, data link jamming, laser “dazzling” of spacecraft optics and nuclear detonations in space. (Scott, 58) A consolidated advocate may be the most

effective method to ensure these vulnerabilities are effectively protected and not adversely impacted creating negative first and second order effects.

END STATE

The desired end state is the mechanism the commander uses to connect the strategic objectives to everything operational. (Joint Publication 5-00.1, II-3) Although, the traditional use of end state does not flow naturally as in an actual war fight scenario, the exercise of defining the “end point” is central to staying nested with the original goals. The aim is to create a military force structure which maximizes the benefit of space while protecting America’s ability to operate in, through and from space.

ASSUMPTIONS

1. US systems are more vulnerable than the other super powers. (Space Commission Report, xiii) Logic: Because America is more highly dependent on space than any other country in the world, it has more components/nodes of its systems exposed to potential attack or degradation.
2. The US is an attractive candidate for debilitating attack. (Space Commission Report, viii and xiv) Logic: After the events of 9-11, America was demonstrated to be vulnerable to certain forms of attack. The Space Commission, among others, recognize and acknowledge that this potential invites other adversaries to employ similar strategies designed to debilitate the US.
3. The other major players will not join forces in an attempt to control space access. Logic: The author did not find a clear assessment of the intentions of the other major actors in space. Research throughout indicates some of their goals and issues, which are primarily internally vice externally focused. While this assumption, may ultimately be proven wrong, this is part of the military decision making process and the author believes

planners must consider this assertion in light of what they may identify as a most dangerous course of action.

4. US dependence on space assets will not decrease. (Space Commission Report, xi) Logic: The Space Commission highlights how space-based technologies are pervasive throughout America and as capacities and emerging technologies increase so will the nation's dependence on them.
5. Success in on-going US operations may invite attack on one or more elements of US space systems. (JP 5-00.1, II-10) Logic: America's enemies should not be expected to stand by while the US achieves its goals. Planners should expect adversaries to continue to try to seek out and isolate US critical vulnerabilities in order to strike where we can be damaged. As indicated earlier, space assets have many parts to their systems, many of which are terrestrially accessible and vulnerable to attack.
6. Space capabilities will become increasingly important in order to better protect the homeland. (Space Commission Report, vii and ix) Logic: The Space Commission clearly supports this assumption. As the threat diversifies and increases so must America's ability to protect itself increase.
7. Space capabilities will continue to be an effective leveling tool in the war on terror. (Space Commission Report, vii / Dodgen, 5) Logic: It may be one of the lesser known stories of the war, but the impact of space-based systems has been repeatedly acknowledged by senior leaders with the AOR. The capabilities they bring are an asymmetric advantage America should continue to use to every advantage.
8. Successfully transforming our military space capabilities is essential to future national security. (Space Commission Report, vii) Logic: The Commission repeatedly spoke to this requirement and it is a theme through their unanimously proposed conclusions.

LEGAL CONSIDERATIONS
(Space Commission, 36-38 / Oberg, 97-101)

1. The Limited Test Ban Treaty of 1963: prohibits any nuclear explosions in outer space.
2. The Outer Space Treaty of 1967: prohibits weapons of mass destruction in outer space.
3. The Rescue and Return of Astronauts and Return of Objects from Outer Space Treaty of 1968: US-USSR/Russia agree to render emergency aid to astronauts and spacecraft.
4. The Anti-Ballistic Missile Treaty of 1972: developing, testing or deploying space-based elements of an anti-ballistic missile system.
5. Liability for Damage Caused by Space Objects Treaty of 1972: launching state is responsible for damages.
6. The Registration of Objects Launched in Outer Space treaty of 1975: all states must maintain a system of accountability and report all launches to the United Nations.
7. The Environmental Modification Convention of 1980: prohibits any actions causing long-term or catastrophic effects in outer space.
8. Multiple US-USSR/Russia arms control treaties protecting “treaty compliance” satellites from interference.

CHAPTER 7

STAFF ESTIMATES

There is a tendency in our planning to confuse the unfamiliar with the improbable. The contingency we have not considered looks strange; what looks strange is thought improbable; what is improbable need not be considered seriously. Surprise is most often not a lack of warning, but the result of a tendency to dismiss as reckless what we consider improbable.

(Space Commission Report, xv)

“The challenge is to find a way to live in the 21st Century as a free people...It requires new ways of thinking...new ways of fighting...and new strategies for defending our people and our way of life.”

(Donald Rumsfeld quoted in Lord Speech at the Royal College of Defense Studies, 9)

Space capabilities are inherently global in nature and joint in terms of the effects they produce...Space capabilities have become both a military and economic center of gravity for our nation and our allies...Space is no longer a sanctuary, and our vision—our culture—must transform appropriately. Space superiority must be our first thought. It must become our way of life.”

(Lord A&SPJ, 13-14)

For the purposes of this investigative effort the staff estimates will represent the additional opinions and perspective that come from many quarters concerned with the proper growth and application of space power. Cumulatively, they provide the foundation for the decision maker’s eventual choice of a particular course of action. The focus for this chapter will be the assessment of space from several different perspectives. These will have the additive effect of combining to create a clearer picture of space and its potential impact. The figure

below, captioned The Final Frontier, gives a view of the complexity of that picture in breadth as well as in depth.



The Final Frontier (AFSPACE High Frontier, 8)

TRANSFORMATION

In the first fifty years of Air and Space Power we did not experience the same level of impact on the battlefield as space provides the modern warfighter.

(Lord A&SPJ, 10)

Clearly the mandate for transformation is woven through everything and every function in the DoD. Undoubtedly there are pockets of resistance, whose mission it is to avoid the kind of change one would describe as transformational. That does not define the characteristics of the space-based systems and capability. By its very nature, space architecture and operations are dramatically so. In fact, Gen Lord, Commander of Air Force Space Command, believes that

space power has not only been transformational with respect to the armed forces, but also on our society. He also believes we are not at a point in time where, "...we simply cannot live—or fight and win—without it (space)." (Lord, Space Power Caucus, 10)

In addition to transformational force structures, space systems have caused speculation and planning for what some believe as the natural eventuality of a time when terrestrially-based weapons systems are made obsolete. (Rife, 7) One example applies directly to maritime force projection. It has been argued that because of the persistent, and near omnipresent capability of space-based systems, they might well make seaborne forces and capability outdated and outmoded. They also postulate that, because these same assets must transit the atmosphere, these same characteristics may threaten the utility of airborne assets. (Rife, 7) If it came to pass as predicted, it would also have tremendous implications for naval and air strategy. There are probably many other examples of how a scenario like that could in fact negatively impact traditional views of military forces in being, but at this point it would be premature to act on conjecture. The possibility, however, is worthy of further study.

The power and potential of space-based architecture and capabilities resides in the phenomenal possibilities of its technological upside. Some reformists believe that it has the potential to be the defense equivalent of the industrial revolution...bringing wholesale reconstruction to departmental organization and execution. (Rife, 7)

If space-based force application approaches the full potential of its technological capabilities...the debate over a separate space service will become obsolete because airpower, as we understand it today, will become obsolete. Space power will be able to do virtually

everything that airpower does today—and do it faster with less risk. Predominantly space forces (with air in an auxiliary role) will subsume the roles and missions of air forces, and the reins of power within the US aerospace force will, by rights, transfer from the combat pilot of today to the space operator of tomorrow. Because we are already an aerospace force, the transition should be a smooth one—perhaps imperceptible.” (Rife, 7)

In addition to the set of future kinetic options, there are a plethora of applications of primary military import. The armed forces are daily impacted by technologies that make things happen or that make things possible. Global communications provide the vehicle to witness news as it occurs, almost wherever it occurs. It also provides the link for instant access, as one can quickly talk directly to almost anyone in any time zone, or just as easily forward them libraries of information within a matter of seconds. Persistent space-based assets provide advance weather warning as predictable phenomena are forming. (Lord, Space Symposium, 2) Additionally, they provide precise global navigational capability around the clock. Each of these advances that have specific military applications are also reflective of accompanying civilian and commercial benefits to which society in general has grown increasingly dependent. Instant global visibility and access has altered forever the traditional view of sovereign territorial boundaries and influence. (Lord, Space Symposium, 2)

Simply said, they (military space capabilities) not only ensure victory on the fields of battle, they save lives on the modern battlefield. Surgical strikes with extremely limited collateral damage; locating and rescuing downed aircrews or stranded marine vessels; tracking friendly forces to avoid friendly fire incidents; the ability to identify track and confirm a target with multiple sources before engagement; and, as we’re proving in Iraq, the swift rebuilding of a nation after the conflict... (Lord, Royal College of Defence Forces, 7)

SPACE AS A DIFFERENT MEDIUM

Space, as a medium, differs physically from air, land and sea. For example, with respect to air forces, they are controlled by the laws of aerodynamics; forces in space are controlled by the laws of astrodynamics as applied through orbital mechanics. How one medium is accessed is greatly different from the other, not only in terms of difficulty, but also in expense. While ease of access, and other equities, may be improved as technology improves, the most basic application of the laws of physics will remain a dividing line. (Moorehead, 1) Whether considering mobility, maneuverability, persistence etc., the physical differences of space from air are as stark as those between any of the other three.

Additionally, the natural limitations associated with the other mediums do not apply in outer space. On land, in the air, and at sea, there are recognized sovereign borders which are distinct from international free flow areas. For example, a country with part of its border on the “open seas” enjoys a twelve mile international buffer zone, which may not normally be infringed upon by foreign naval forces. Similar “rules” are recognized globally with respect to a country’s airspace, and of course this is true for any landmass. In space, however, there are no such limits as outer space is recognized as having unencumbered and free access to all nations. Because of these differences the potential military application for establishing localized superiority are very different. Without terrestrial geographic limitations, superiority in outer space has the potential to span the globe—literally. Therefore weapon systems, among others, must be understood from a global perspective vice a localized one. (Lord, Royal College of Defence Forces, 7)

Orbiting space systems have the potential to impact an enormous portion of the globe, and therefore, space superiority must be evaluated from the perspective of all of space, not just a

limited theater of operations. In our effort to achieve space superiority, even for a limited duration in some future conflict, we must consider the overall impact of our operations on the “commons “of space. If, for example, the United States impedes on the commons...part of the exit strategy for that conflict must be the return of space to a commons allowing all nations full access. Therefore, areas of conflict, such as geostationary spacing or spectrum allocations, must be dealt with from the viewpoint of the commons, as well as from the viewpoint of individual nations...

(Lord, Royal College of Defence Forces, 7)

GLOBAL WAR ON TERRORISM

When you combine an increased dependence on space...with emerging threats...it doesn't take much convincing to understand...we need to act today to ensure Space Superiority in the future.

(Lord, Space Power Caucus, 4)

Clearly the enemies of America recognize her conventional strengths. These strengths have been confirmed for them in the wake of Operations Desert Storm, Enduring Freedom and Iraqi Freedom. The power, flexibility, mass and maneuver the US consistently generates with a large force is accentuated due to the capabilities made possible through space. This added advantage creates a synergy that is currently unmatched across the world. These successes have not been lost on America's enemies, and, as a result, they have learned to adapt and embrace an ongoing campaign of asymmetric warfare. By attempting to dissipate America's strengths, the enemy hopes to highlight weaknesses and turn that to their advantage.

Our adversaries know the value and benefit we derive from space to enhance, improve and transform all our operations. They will increasingly try to deny us the asymmetric advantage that space provides. We faced a rudimentary GPS jamming threat in Iraq, but that's only the tip

of the iceberg for what's in store. We simply must have the ways and means of detecting, characterizing, reporting and responding to attacks in the medium of space.

(Lord, Royal College of Defence Forces, 6)

The technology explosion has created new definitions of what is possible. As the threat to America, and its allies, has grown and developed into a sophisticated amorphous entity, the tools and capabilities in the US arsenal have also grown. LT GEN Dodgen, the Commanding General of the United States Army Space and Missile Defense Command, believes that “combat power is rooted in capability” and that space is the “medium of choice” in helping create operational success. (Dodgen, 1) A major reason for this success has been the military leveraging of the incredible growth of information technology. The ability to quickly share large amounts of information is readily associated with the Western world, but that in itself is not necessarily revolutionary. What is revolutionary, and also key to the development of space as, not only a combat multiplier, but the difference maker, is the ability of the US to do it within the confines of a command and control structure which enabled the armed forces to “operate with enormous speed and unprecedented flexibility.” (Dodgen, 1)

Some of the actual systems used to deliver these capabilities supported directly by military satellite constellations are the satellite communications (SATCOM); Global Positioning System (GPS); Blue Force Tracking (BFT). (Dodgen, 2) SATCOM capability is always critical. Being able to guarantee communications provides the needed advantage for increasing friendly situational awareness while operating inside the enemy's decision cycle; also called the observe-orient-decide-act (OODA) loop. During OIF SATCOM bandwidth reached 800 megabytes per second and was 42 times greater than what was available during Desert Storm. (Dodgen, 2) Gen

McKiernan, OIF Combined Force Land Component Commander, reflects, “The technology advances in our military today...allowed me to talk via tactical satellite communications and other means across a battlespace of hundreds of miles...it allowed us to make decisions and then execute those decisions faster than any opponent.” (Dodgen, 2)

Joint Tactical Ground Stations provided Theater Ballistic Missile Defense monitoring. The coalition received the estimated time, trajectory, launch and impact points and disseminated them via direct theater-wide command and control links. (Dodgen, 1) All told, these comprehensive capabilities combined to ensure 100% detection of all 20 Iraqi TBM launches and notification to all targeted troops. (Dodgen, 1) Next generation location and navigation technology provided by GPS guided precision munitions that made up approximately 60% of the bombs dropped in OEF and approximately 66% of those dropped during OIF. (Dodgen, 3)

The layered redundancy and improved capabilities provided by space-based assets will significantly enhance situational understanding and will prove particularly valuable in immature theaters....Clearly, the successful transformation to the Future Force will depend largely on our ability to develop and operationalize new and improved Space-based capabilities. The need for great emphasis on Homeland Security, the ongoing Global War on Terrorism, and commitments in austere locations likely define our near future. The effective use of space is essential to our combat forces in fulfilling these missions. (Dodgen, 5)

Space power continues to improve our battlefield speed, precision, lethality, reach and flexibility...In a matter of minutes, not weeks, hours or days as in past wars, commanders identified and engaged targets and received timely battle damage assessment. Our Coalition, and our adversary, got the message: space power is now in the fight like never before.

(Lord, SASC, 1-2)

ISSUES

In the three years between Yugoslavia and Afghanistan, American airpower went from being effective principally against fixed targets like infrastructure to routinely devastating moving formations using real-time intelligence with the help of faster satellite relays.

(Elhefnawy, 1)

Despite exploding technological capability and the US's current world-wide lead in space America's ability to continue this level of leadership, while denying access to her enemies will not be unchallenged. (Elhefnawy, 1) On the surface, it would be a stretch to assume that the US would have a near peer challenger capable of similar global impact. China is assessed to be one to two generations behind; Russia has the infrastructure, but will continue to be resource constrained for the foreseeable future; Japan has suffered repeated economic setbacks and is hesitant to divert attention to any "military" expenditures; and the EU is not yet a consolidated political and defense force causing its development to advance too slowly to be a serious challenge. (Elhefnawy, 1-2)

Despite these assessments and the reality they bring, there is still a viable threat from the open market. As a collective, many commercial industries offer space-based capabilities to those able to pay for their services. (Elhefnawy, 2) The impact of these technologies being available to America's enemies should not be underestimated. There is ample evidence that they understand flexibility and the power of commerce, in using all available means to accomplish their goals. The bottom line is that the US could be effectively opposed by well-funded enemies who purchase then leverage commercially available space-based technologies for their own purposes. (Elhefnawy, 2)

Another issue that must be considered is the thought that in order for America to be opposed in space, her enemies would have to possess the weapons to attack into, or through, that medium. (Elhefnawy, 3) There are several asymmetric schools of thought, which, if leveraged, could provide adversaries with considerable freedom of action. The first method is to attack/disable ground stations and/or their associated up/down links. (Elhefnawy, 3-4) Another method comes through the use of special or submarine forces. Each capability provides unique targeting challenges for a nation relying on its space forces to eradicate any opposition. (Elhefnawy, 3-4) America's enemies could finance and develop directed energy and other weapons capable of impacting and/or defeating space-launched munitions would force the US to fund next-generation and perhaps, much more expensive space-launched weaponry. (Elhefnawy, 4) Lastly, the potential for a new deterrence model needs to be addressed through the lens of a modern multi-polar world. Interstate wars, proxy wars, global conflict resolution, failed states, and non-state actors all provide additional problem sets which will not be resolved by one country's domination of the theater of outer space. (Elhefnawy, 5-7) Each example, briefly highlighted above, could conceivably empower enemies of the state as they seek to neutralize or defeat American global power.

Another challenge, as addressed briefly earlier, is the issue of space power funding. There is a school of thought that believes it will be almost impossible for America's space power to truly develop as long as it must compete for funding within the Air Force. (Moorehead, 2) The argument centers on the position that organizations protect and fund those core requirements that support or drive their primary mission. It follows that the Air Force is primarily concerned with air forces, which does not effectually include space...at least not when tough funding decisions must be made. An example of this was evidenced when the Air Force allowed the joint

space-based radar demonstration to be cut and the Space-Based Infrared System to be delayed. However, when faced with a similar Congressional effort to isolate and attack the F-22, the Air Force mobilized on all fronts to protect what they consider to be a required legacy weapon system. (Moorehead, 2) The resultant impact is that the services leverage space to support operations, but they prioritize to meet their Title X responsibilities, which do not necessarily include developing separate theory, doctrine or funding for space as a unique entity. (Moorehead, 2)

The high cost of space technology drives the need to develop cogent moral, theoretical, and doctrinal underpinnings for space power. By doing so, we can persuade our political leaders to spend money on the right technologies and force-development initiatives, thereby assuring the United States the maximum benefit from space power. (A&SPJ, 17)

TENTATIVE COURSES OF ACTION

COA 1 – AFSPACE is the lead agency for the Department of Defense in all space matters.

- This scenario is a continuation of the overall organization as it currently exists.
- Mission (Task/Purpose): Lead DoD as focal point and synthesizer of US military space capabilities in order to protect US national security against current and developing threats.
- Method: Generate and control the majority of budget actions; rapidly incorporate pre-approved Space Commission findings; and coordinate emerging technologies.
- End state: The end state occurs when a force structure is created which maximizes the benefit of space while protecting America's ability to operate, in, through, and from space.

COA 2 – Make space a sub-unified command under STRATCOM,

- This scenario is loosely based on a JSOC styled model.
- Mission (Task/Purpose): Lead DoD as focal point and synthesizer of US military space capabilities in order to protect US national security against current and developing threats.

- Method: Give Major Force Program power and responsibility at the sub-unified level. Lead all individual services with acquisition, research and development, and prioritization plans and focus.
- End state: The end state occurs when a force structure is created which maximizes the benefit of space while protecting America's ability to operate, in, through, and from space.

COA 3 – Create the United States Space Forces with space as a separate service.

- This scenario would set up a new military department within the DoD on equal footing, with respect to priorities and funding, as the other services.
- Mission (Task/Purpose): Lead DoD as single service responsible for US military space capabilities in order to protect US national security against current and developing threats.
- Method: As proprietary and single owner of Title X responsibilities for space, focus service development to support growth of theory, doctrine and developmental priorities.
- End state: The end state occurs when a force structure is created which maximizes the benefit of space while protecting America's ability to operate, in, through, and from space.

CHAPTER 8

COMMANDER'S ESTIMATE

It's politically sensitive, but it's going to happen. Some people don't want to hear this, and it sure isn't in vogue, but—absolutely—we're going to fight in space. We're going to fight from space and we're going to fight into space. That's why the US has development programs in directed energy and hit-to-kill mechanisms. We will engage terrestrial targets someday—ships, airplanes, land targets—from space.

Gen Joseph W. Ashy, Former CINCSPACE, (Shah, 1)

What we don't need is another study...The bottom line is, 'space' has matured much faster than space control, and that includes policies."

RADM Zelibor (Scott, 58)

The commander's estimate embodies the end result of the entire planning effort to that point. The commander will use this product to forward his decision for the selected course of action. It will also serve as a tool for additional planning for staff and subordinate commands. (Joint Publication 5-00.1, III-12) What would normally occur, during this stage, is COA analysis through wargaming. This is critical because it allows the staff to test the strength of the proposed plan, identify weaknesses and potential decision points, and commander's critical information requirements. (Joint Publication 5-00.1, III-12) After the COAs are individually researched and evaluated, they are individually scored against selected criteria. They are then compared to each other, using the associated scores. Finally, after the staff makes their recommendation, the commander selects the COA he wants to develop. (Joint Publication 5-00.1, III-12) The author will address other COA issues etc. in the chapter on recommendations.

ANALYSIS

The challenges facing us do not merely require us to redefine the military piece of national security for an environment lacking a “traditional” battlefield threat. Rather, we must forge the broader security instruments necessary to support US leadership in a world when accelerating change and increasing ambiguity are dominant features. We must seize the opportunity to shape the evolving strategic landscape—not simply to contain the evil, but to expand the larger global “good.” (Cebrowski, 3)

*In total war it is quite impossible to draw any precise line between military and non-military problems. Winston Churchill, *Their Finest Hour*, 1949 (JP 5-0, II-1)*

Courses of Action

In order to evaluate individual potential and then compare and select the course of action best suited to escort the US into the future, the author used manual wargaming. (JP 5-00.2, IX-47) The critical event technique emphasized the importance of three primary elements, agility, acquisition and force development, and transformational impact. These were three of the seven overall governing factors. These factors were the universal standard/criteria applied to each COA, allowing for a fair and balanced individual evaluation. They are defined below:

- Agility – Ability to rapidly meet and sustain mission area requirements
- Flexibility – Appropriate mix of forces and capabilities to deter or defeat any enemy threat or attack with actions appropriate and adaptable to existing circumstances
- Acquisition and Force Development – Ability to apply/execute budget to build appropriate military space infrastructure and core functions (doctrine etc)
- Command and Control – Task organized to meet cross-DoD synthesis challenges
- International Support – Amount of support anticipated from international powers. {Nation states as well as IGOs} (More support is better)
- Resource Cost – Amount of additional resources and infrastructure required to implement COA. (Less is better)

- Transformational Impact – Capability of COA to implement and leverage SECDEF’s capabilities-based vision

After the governing factors were solidified the COAs were scrutinized using the analytical matrices shown below. The governing factors were the standard and the COA was evaluated, in isolation, as to its capacity for meeting those factors as defined above. However the governing factors were advantageously or disadvantageously addressed/accomplished by the COA it was so rated. The assessment of neutral was only used if it was determined that the change would not be a marked departure from the current status quo.

COA #1 Analysis (AF Space)

	Advantageous	Disadvantageous	Neutral
Agility	✓		
Flexibility	✓		
Acquisition and Force Development		✓	
Command & Control	✓		
International Support			✓
Resource Cost	✓		
Transformational Impact		✓	

Course of action number one performed well with the exception of two of the governing factors. Acquisition and force development rated as disadvantageous in performance due to the impact of multiple service equities and a limited span of control. Transformational impact was also rated negatively because of its limited ability to meet the spirit of the SECDEF’s vision for

transformation due also to its limited span of control. International support was neutral because it should not vary dramatically from the present day standard.

COA #2 Analysis (Sub-unified)

	Advantageous	Disadvantageous	Neutral
Agility	✓		
Flexibility	✓		
Acquisition and Force Development	✓		
Command & Control	✓		
International Support		✓	
Resource Cost		✓	
Transformational Impact	✓		

COA number two also performed well overall. However, resource costs were assessed to be high as transitional infrastructure (leadership and hardware) and were established. International support was viewed as negative because of the definite signal the world community would receive from such a force structure alignment.

COA #3 Analysis (New Service)

	Advantageous	Disadvantageous	Neutral
Agility	✓		
Flexibility	✓		
Acquisition and Force Development	✓		
Command & Control	✓		
International Support		✓	
Resource Cost		✓	
Transformational Impact	✓		

COA number three performed well. International support was assessed to be extremely negative due to the definite force structure reconfiguration and how that would be received. While current service equities could be absorbed and reallocated, resource costs were appraised as negative due to significant additional levels of investment required.

Results from Wargaming

Decision Matrix / Recommendation

1 Criteria	3 Weight	4 Courses of Action					
		COA 1		COA 2		COA 3	
		Rating	Product	Rating	Product	Rating	Product
Agility	3						
Flexibility	2						
Acquisition and Force Development	4	1	4	2	8	3	12
Command and Control	2						
International Support	2						
Resource Costs	1						
Transformational Impact	3						
5 Weighted Total			4		8		12

After completing the individual evaluations, the course of action analyses were consolidated within a decision matrix for comparison and selection of the recommended option. COA performance was assessed by category and then converted numerically. When that was accomplished, each of the governing factors was weighted by degree of importance, with the three critical events weighted most heavily. The rating value was multiplied by the weight and then the products were sub-totaled and totaled as depicted in the example in the above figure. The final analysis came after fully populating the matrix as seen below:

Results from Wargaming

Decision Matrix / Recommendation

		Courses of Action					
		COA 1		COA 2		COA 3	
Criteria	Weight	Rating	Product	Rating	Product	Rating	Product
Agility	3	1	3	2	6	3	9
Flexibility	2	1	2	2	4	3	6
Acquisition and Force Development	4	1	4	2	8	3	12
Command and Control	2	2	4	2	4	2	4
International Support	2	3	6	2	4	1	2
Resource Costs	1	3	3	2	2	1	1
Transformational Impact	3	1	3	2	6	3	9
Sub Total		12		14		16	
Weighted Total			26		34		43

The end result of the wargaming analysis was a detailed evaluation of the COAs individual capabilities as well as how they performed relative to each other. COA number three is the best choice for the road ahead for military space power. It performed the best overall and in each of the three critical areas.

Whether costs prohibit achieving the capabilities demanded by our future depends on how they are met. If the cost of transformation is simply added to the costs of maintaining the legacy systems, doctrines, and processes we have carried into this century, the transformation process will go slower. But, if we pay for the new by relinquishing the old—as we should and are likely to do—it will not only go faster, but will accelerate. (Cebrowski, 11)

The Military Decision Making Process

There were several considerations, with respect to the overall process, which the author forwards as worthy of note. The following brief, point-counter point addresses any negative aspects and gives the author's assessment of their validity

While the MDMP is a written and codified methodology, there is not one clearly recognized standard represented in joint or strategic publications. This is not a limiting aspect of the model; in fact it accentuates its flexibility as one is able to extract and apply those aspects required to address the problem under consideration. (These may vary.)

Another point is that the disciplined approach it offers could also be seen as confining for some planners. This could be true if the model was not so malleable. The key lies in the planner's experience and training in properly executing general guidelines. The end result is not confining, but empowering through its effectiveness.

Finally, the model's comprehensive approach could be seen as too time consuming. Until the planner, or decision maker, gained some experience this methodology could well prove to take longer than desired. Once experienced, its ease of use would defuse this objection.

Despite the possible negative aspects of this model, the positives far out weigh them and its clear record of success speaks volumes about its applicability. As can be seen through this document, the author's experience in utilizing the MDMP for non-standard, strategic problem

solving proves the utility of the model; it also clearly represents the best and most tangible endorsement.

The dogmas of the quiet past are inadequate to the stormy present. The occasion is piled high with difficulty, and we must rise with the occasion. As our case is new, so we must think anew and act anew. Abraham Lincoln, 1862, (Cebrowski, 1)

CONSIDERATIONS

“...public support is, in turn, dependent on a very low, if not zero casualties, and a high degree, a very high degree, of effectiveness of our forces, an exemplary display of those conventional forces. And that, in turn, is dependent on space.”

James Schlesinger, Former Sec of Defense/ Energy, (Lord, Royal College of Defence Forces, 7)

America's burgeoning space based capabilities have built an impressive record of success in multiple sectors of society. The direct impact has tremendous commercial, economic as well as national security implications. The increasingly prominent role the space community has played in conflicts since Desert Storm coupled with the information technology explosion has continued to raise expectations about what is possible during a time of war. It also highlights the need to proactively develop the future of national security space initiatives in order to lead turn challenges while maintaining overall US space superiority.

The defense community acknowledges that space is integral to America's capability to dominate the battle space. Additionally they must work to develop appropriate concepts of

operation which support American strengths, while avoiding strategies that may expose potential weaknesses. (Lord, Symposium, 8) Since the US is more heavily leveraged and committed in space, when compared to the rest of the world, it is also more vulnerable.

Each time we've sought the higher ground throughout history our adversaries developed capabilities to attempt to deny this advantage. Space is no different. Our adversaries develop methods to counter observations from space. Future adversaries will attempt to counter our capabilities in future conflicts with counter space weapons that I'm confident will range from kinetic kill through numerous non kinetic effects. We saw the first use of these in the conflict this past year with Iraq's use of GPS jammers in Operation Iraqi Freedom.

(Lord, Symposium, 8)

What might be most telling is the repeated service-level focus and vision espoused by Gen Lord, the commander of Air Force Space Command. Even if there is never an open campaign for a separate service, his language indicates AFSPC has accepted the responsibility and is moving out to fill the void. “The result takes us beyond the integration of air and space toward interoperable full spectrum joint and coalition response capability with increased range, speed and precision.” (Lord, Symposium, 7) This is arguably as large of a mission area as those enjoyed by any of the services. It is certainly beyond the scope of responsibility normally focused at in a MAJCOM.

CHAPTER 9

CONCLUSIONS

But we cannot be naïve. We know that where man goes, conflict invariably follows. We must be prepared to defend our interests in space while we promote its peaceful use of space for all mankind...

(Lord, Royal College of Defence Forces, 3)

Due in large part to space systems, US military forces know more about their adversaries, see the battlefield more clearly, and can strike more quickly and precisely than any other military in history. Space systems are inextricably woven into the fabric of America's national security.

(Teets, A&SPJ, 4)

Throughout this project the author gained a tremendous appreciation for the depth of information defining the outer limits of this important topic. Clearly the time has come to move beyond the linear development of US capabilities in, through and from space. America is just beginning to expand beyond the view that space is primarily a supporting function. Over twenty years ago, Gen Robert Herres, former CINCSPACE, identified how critical space was and the “decisive edge” it provided. (Stares, 4) This country now stands at a significant crossroads and the strategic implication of the timing could be advantageous if it decides to act.

Historically America's enemies have represented themselves primarily from the ranks of nation states. Currently the US and its allies are in a struggle against a somewhat amorphous non-state actor directly and indirectly supported by other non-state actors, as well as rogue, failed and weak states. A key weapon in America's arsenal is the strength of its technological

advantage, most notably in space. If senior military leaders adopt and implement the recommendations articulated in Chapter 10, the foundation should be established to maximize this asymmetric advantage. This sentiment and strategic direction is echoed by the former Under Secretary of the Air Force, the Honorable Peter Teets; “Our toughest challenges demand new capabilities to improve and transform our space forces. We seek to create a synergistic and integrated mix of land, sea, air, cyber, and space power that provides additional options: (1) to warn of threats to our homeland and US interests; (2) to deter aggression, dissuade adversaries, and prevent coercion; and (3) to fight and win decisively, as necessary.” (Teets, A&SPJ, 8)

Although America has maintained the technological advantage, in order to leverage similar or greater advantages in the future, the US must not stagnate. “Future war fighting will demand more responsive and integrated operational concepts and the acquisition of flexible, innovative systems and capabilities.” (Teets, A&SPJ, 7) Gen Lance Lord, the commander of Air Force Space Command, has given many speeches with well crafted vision statements, and messages, outlining the next steps in the development of military space power. Undertaking a planning effort promulgated through the military decision making process would not only protect America’s current investment, but would also provide a sound foundational focus.

The author is absolutely convinced of the utility of this mechanism for logical and comprehensive problem solving. Having it embedded within the deliberate planning process provides the additional structure and rigor required for national level issues. As the evaluation evolves, the best course of action will be confirmed, carrying with it a number of requirements

necessary to accomplish prior to implementation. The resultant decisions should drive specific funding and organizational initiatives in order to prepare for success.

Another benefit of the completed military decision making process is that it drives one through several war gaming scenarios. These are required in order to test the tentative courses of action, in depth, against the adversary's assessed most dangerous and most probable courses of action. This analysis alerts the planning team to potential decision points, required branches and/or sequels, more specific intelligence requirements and potential task organization adjustments. (JP 5-00.1, III-11) Because the COAs are initially only evaluated against a standardized set of evaluation/governing criteria, it is only upon further analysis that it becomes apparent which COA best supports the commander's objectives across the spectrum of conflict.

Throughout this text, as the author has drawn attention to multiple issues surrounding the development of a road ahead for military space power, there have been several areas which bear expansion as we refine our strategy. The first and most time sensitive is the need for an updated national space policy from which the DoD and other agencies can structure their participation. Upgrading the current approach to strategic assumptions, constraints and restraints will also prove to play essential roles as the strategy is assessed (through compartmented and special access lenses) and as doctrine is developed and applied. The US should also quantify the stratified impact of the loss of access to space, and/or its capabilities, and how that might be viewed by enemies of the state as they formulate their courses of action. Once this level of understanding has been crafted, space-specific flexible deterrent options should be identified and

investigated in order to complete the comprehensive menu of options available to our senior leaders.

In this study, the author's initial thesis was that the natural evolution of what could be termed an American asymmetric trump card will eventually necessitate its development as a separate service. After extensive research, study and analysis, the author still believes that this is the correct path for America to follow. However, in order to provide operational depth to this position, planners should rigorously war game each of the potential courses of action using the highest levels of classified intelligence as points of departure. This analytical methodology is required to undergird the final selection of the road ahead. Outlined in the above paragraph, the tools to accomplish this should be available to any Joint Chiefs of Staff joint planning group, whose role it would be to further develop this project. This kind of disciplined approach offers an opportunity to address a very rapidly developing mission area with unemotional and predictive analysis. The solution, tested, focused and proactively developed, should then be within our grasp for ordered implementation. The result would be an America organized, trained and equipped to execute offensively while comprehensively defending against another enemy attempt at a Coup de Main.

History is replete with instances in which warning signs were ignored and change resisted until an external, "improbable" event forced resistant bureaucracies to take action. The question is whether the US will be wise enough to act responsibly and soon enough to reduce a US vulnerability. Or whether, as in the past, a disabling attack against the county and its people—a "Space Pearl Harbor"—will be the only event able to galvanize the nation and cause the US government to act. We are on notice, but we have not noticed.

Space Commission Report, xv

CHAPTER 10

RECOMMENDATIONS

The United States must win and maintain the capability to control space in order to ensure the progress and preeminence of the free nations. If liberty and freedom are to remain in the world, the United States and its allies must be in a position to control space.

Gen Thomas White (CSAF 1959) (Lord, Royal College of Defence Forces, 3)

‘...war in space has already started.’ We simply must have the ways and means of detecting, characterizing, reporting and responding to attacks in the medium of space.

Hon James G. Roche, SECAF (Lord Space Symposium, 7)

There are multiple areas which must be addressed in order to definitively outline the future for military space power. Without question, there must be an orderly approach to problem solving if key leaders are to have the background and depth of knowledge required to prepare them to chart the best way ahead for America. The author’s prioritized recommendations are as follows:

1. America needs a new national policy for space. Logic: The current policy is dated and not synchronized with more recent national security policy documents, like the National Security Strategy. Many of the space-based capabilities that have their foundation in new technologies have expanded the “realm of the possible,” therefore America’s strategic vision should proactively expand. Once that is resolved, military leaders will have the most critical element required to develop effective military strategy—an articulated national strategy. Whether it (strategic guidance) is propagated as a new National

Strategic Presidential Directive or as a public position communicated via the State of the Union Address, the only essential criterion is that a clear commitment is articulated.

2. Military leaders must ensure that strategic assumptions are rigorously set apart as guideposts, because assumptions from above, in the chain of command, are treated as facts. Logic: Strategic Assumptions are those issues—supported by credible information, data and intelligence—on which US national leadership bases its direction. Armed with these essential tools, decision makers will be better equipped to ensure plan / program development remains nested with the national strategic direction. Accuracy is therefore all the more critical, because it will synchronize planners' points of departure with those of senior leaders early in the process.
3. Once the strategic assumptions have been defined, senior planners should then understand those issues which will be recognized as constraints and restraints. Logic: The constraints, or things we must do, and the restraints, or things we must not do, will play crucial roles by adding depth to the planning efforts. They provide important additional planning guidance with respect to the limits of the undertaking. Without them the study, effort or actual operation might very well lack some of the desired focus.
4. Senior planners should analyze the impact of varying degrees of the loss of access to space and/or its products. Logic: An in depth and accurate assessment is required to determine redundancy of systems and the effect of secondary “analog” solutions to a previously digital mosaic. There are many published articles and papers assessing the

level of America's dependency on space. This data is largely product based and would be usefully expanded in utility if addressed from this fresh perspective. Additionally, this would provide the added benefit of identifying critical nodes while quantifying American vulnerability.

5. After understanding all of the above, the next step should be to renew the consensus of what the most probable (MPCOA) and most dangerous (MDCOA) courses of action.

Logic: This will be based on in depth assessments, followed by analysis, of individual nation states, alliances, and non-state actors. This is also a critical step, because there needs to be general strategic agreement on the level of the threat in order to effectively plan to defeat it. Senior leader involvement in this aspect of the national intelligence apparatus should serve to promote more educated decision making and well considered risk taking.

6. Next, execute a full staff estimate process with complete Sensitive Compartmented Information (SCI level) JIPB and COA analysis. Logic: This is a critical step because it should ensure the most up-to-date information is used throughout the planning effort. While always important, it is even more so in this case due the speed of technological development (explosion). Additionally, many of these emerging technologies may have several components or aspects which are best understood from a compartmented perspective. Completing staff estimates with this potentially additive granularity should provide appreciable depth to all levels of planning efforts.

7. The next step should be to integrate the collected data into the tentative COAs and war game each scenario against each of the MPCOA and MDCOA for each of the adversary preconditions in recommendation number five. Logic: As indicated in the conclusions, the disciplined execution of this step should provide the comparative analysis required for decision makers to develop predictive solutions for subsequent implementation. This step is essential for a number of reasons, not least of which is that it provides largely objective substantive depth to decisions. Additionally, the rigor of war gaming identifies issues which potentially drive development of required branches and/or sequels.
8. Specific space doctrine needs to be crafted and refined. Logic: Supported doctrine is central to any military effort. While it is not directive, having a universally understood standard, from which to deviate, maximizes effectiveness and creates the synergy that makes US armed forces the best in the world. The JIPB, mission analysis and war gaming steps will help identify developmental starting points for the creation of space doctrine. Accurately evolved, these authoritative guidelines should be based on space-specific data. If this is done, it would fill a current void in much needed employable space doctrine.
9. Specific space flexible deterrent options (FDO) also need to be crafted, refined and well understood. Logic: FDOs are tools for senior decision makers to use, specifically designed to obviate/precede the requirement to use kinetic options. As America's capabilities in space continue to grow the US should proactively consider how to leverage them in scenarios seemingly headed to the armed conflict stage. Eventually,

space FDOs will be implemented as frequently as other non-kinetic military options and instruments of policy.

If these steps are taken, US military space strategy should be logically established and well on its way to fulfilling its mandate. The author believes the product of this studied decision making method and the future of military space power will be the eventual margin of excellence that keeps America ahead of its enemies.

In addition to requiring global leadership, our world position makes us a tempting target for those who would attack us. We may face direct challenges-attacks on our homeland, our citizens and soldiers overseas, and our military and commercial information systems. We may face indirect challenges as well as those who resent our leadership seek to increase the costs of our global position and seek to block access to the ports and battlefields of the future. We may face challenges to our allies and friends in conventional and unconventional forms that affect our own national interests. And we continue to face challenges associated with being a global leader, as others ask us to contribute troops to help keep the peace and stem violence. Given the breadth of these challenges, our national military strategy continues to matter and the size and strength of our military matter as well. A good force structure with the wrong strategy is useless. So is a good strategy with the wrong forces.

Congressman Ike Skelton, 4 Sept 2001

APPENDIX A

DELIBERATE PLANNING FORMAT HANDBOOK

(Derived from JP 5-00.1, JP 2-01.3, JFSC Pub 1, & JTF Headquarters Master Training Guide)

This compilation of the steps intrinsic to the deliberate planning process was put in the following sequence by the author. This attempt to create a focused tool or outline was intended to serve as just that, a tool/outline. It was initially shaped to create an orderly progression designed to satisfy doctrinal requirements, as highlighted in official publications. The author did not treat it as directive, but rather as a comprehensive “virtual” template from which one could gain perspective; choosing to address certain areas based on applicability to the problem set under consideration.

For the purposes of this study, this format provided the structured methodology of the Military Decision Making Process applied to a problem/question of strategic proportions. Additionally, it represents a synthesis of the major course of study for the JAWS program and acts as a tailorable pocket version with ever increasing efficacy. The author anticipates future utility as it is refined over time. Finally, this tool brings a doctrinally-based focus while providing an asset which can be readily flexed to meet the dynamic imperatives faced daily by planners at many levels.

a. Initiation (**MDMP Start**)

- i. Major JSCP Tasks + peacetime deliberate planning tasks
- ii. NCA and/or CJCS planning guidance for the COCOM
- iii. Forces and resources as per JSCP

iv. Strategic guidance

1. Strategic end state—what defines victory or success? What is the military strategic objective? Are you pursuing limited or unlimited strategic political objectives?
2. Method of employing military force
3. Strategic Constraints
4. Strategic Restraints
5. Strategic Assumptions

v. Joint Intelligence Preparation of the Battle space (JIPB)—characteristics

throughout >> JIPB should be >> timely / available / relevant / objective / complete / usable / accurate

1. Define the battle space environment
 - a. Identify the limits of the joint force's operational area
 - b. Analyze the joint force's mission and joint force commander's intent
 - c. Determine the significant characteristics of the joint force's operational area
 - d. Establish the limits of the joint force's area of interest for each geographic battle space dimension
 - e. Determine the full, multi-dimensional, geographic and non-geographic spectrum of the joint force's battle space
 - f. Identify the amount of battle space detail required and feasible within the time available

- g. Evaluate existing data bases and identify intelligence gaps and priorities
 - h. Collect the material and intelligence required to support further JIPB analysis
- 2. Describe the battle space effects
 - a. Analyze the battle space environment
 - i. Analyze the military aspects of each dimension
 - ii. Evaluate the effects of each battle space dimension on military operations
 - b. Describe the battle space's effects on adversary and friendly capabilities and broad courses of action
- 3. Evaluate the adversary
 - a. Identify adversary centers of gravity
 - b. Update or create adversary models
 - c. Determine the current adversary situation
 - d. Identify adversary capabilities
 - e. How does the adversary:
 - i. Organize
 - ii. Make decisions
 - iii. Fight
 - f. What is the status of the adversary's:
 - i. Psychological strengths and weaknesses
 - ii. Leadership

- iii. Fielded forces
- iv. Resources
- v. Infrastructure
- vi. Population
- vii. Transportation systems
- viii. Internal and external relationships

4. Determine the adversary courses of action

- a. Identify the adversary's likely objectives and desired end state
- b. Identify the full set of courses of action available to the adversary
- c. Evaluate and prioritize each course of action
- d. Develop each course of action in the amount of detail time allows
- e. Identify initial collection requirements

b. Mission Analysis

i. Task Identification

- 1. Specified
- 2. Implied
- 3. Mission Essential

ii. Mission Statement

- 1. Must answer the questions Who/What/Where/When/Why?
- 2. Must be short, clear and joint
- 3. Coordinate with other IOPs

4. Must pass the coalition test
- iii. Apportioned Forces
 1. Also consider adversary capabilities
 2. Terrain and geographic features that support friendly and adversary forces
 3. Climate
- iv. Controlling Factors
 1. Diplomatic Agreements
 2. Host nation economic conditions
 3. Host nation issues
 - a. Support agreements
- v. Facts and Assumptions
 1. What obstacles may preclude mission accomplishment?
 2. Work to prove your assumptions true or adjust plan if required
- vi. Endstate
 1. The required conditions that achieve the strategic objectives
 - a. Must be clearly defined
 - b. Both political and military conditions
 2. Reiterate commander's intent
- vii. Adversary and Friendly COGs
 1. Strategic (leadership / national will to fight / public support / coalitions / alliances) and operational (elements of armed forces / concentration of military power)

2. Which system elements protect, sustain, and/or integrate its components?
3. Avoid mirror imaging
4. Critical Capabilities—crucial enablers for COGs to function and are essential to the accomplishment of objectives
5. Critical Requirements—essential conditions, resources and means for a critical capability to be fully operational
6. Critical Vulnerabilities—aspects of critical capabilities and critical requirements which are deficient or vulnerable to neutralization, interdiction or attack achieving decisive or significant results
 - a. Check vulnerability / recuperability / and redundancy
7. Validity testing of COGs—analyze to determine if destroying, neutralizing or substantially weakening a COG will cause the changing of an adversary COA or denying its strategic objectives
8. Friendly COG Analysis—same as above and add:
 - a. How/ when / where / why – do friendly forces become vulnerable to hostile actions?
 - b. How / when / where / why – do we need to make appropriate adjustments to protect friendly COGs?

viii. Direct and Indirect

1. Strategic level – (Indirect) – depriving enemy of allies, friends, weakening national will to fight by undermining the public support for the war, and breaking up cohesion of adversary alliance or coalitions

- 2. Operational level – (Indirect) – reducing enemy’s operational reach, isolating the force from its command and control and destroying or suppressing key protection functions such as air defense
- ix. Decisive Points—staff analyzes DPs to determine which ones (geographic, physical or functional) can be leveraged to indirectly attack enemy COGs, extend friendly operational reach or enable the application of friendly forces / capabilities
- x. Operational Concept
- xi. Branches and Sequels—parallel or subsequent operations
- xii. Tentative Mission Statement—clear and concise with task and purpose
- c. Planning Guidance Development
 - i. Initial Guidance—used to focus the staff’s planning efforts
 - 1. Restated Mission Statement
 - 2. Assumptions—must be logical, realistic and essential for the planning to continue
 - 3. NBC Warfare—must assess the potential impact on friendly operations
 - ii. Political Considerations—deployment issues among many others, overflight/basing etc. POLAD should be able to help/engage here...
 - iii. Tentative Courses of Action—based on COCOM’s preliminary thoughts about acceptable military actions
 - iv. Planning Schedule—set by the chief of staff to aid planning flow
 - v. Initial Staff Briefs—accomplished from across the COCOM staff

- vi. Initial Commander's Intent—describes what the COCOM wants to see after the mission is complete. May address sequence of actions; assessment of the adversary commander's intent; the COCOM's assessment of risk, where he will accept it and what he will do to mitigate it.
- vii. Commander's Critical Information Requirements—deemed as critical to the commander's decision making process
- viii. Course of Action Development—follow doctrinal pub flow
 - 1. A valid COA must be suitable, feasible, acceptable, distinguishable and complete
- ix. Planning Directive—COCOM uses this to communicate initial planning guidance to the staff, subordinate commanders etc. Ensures everyone understands his intent and fosters unity of effort.
- d. Staff Estimates—Staff elements analyze each COA for supportability in order to provide the foundation for the COCOM's COA selection process.
 - i. Thorough and Well Coordinated Plan
 - ii. Staff Involvement
 - iii. Determination of Potential for Mission Accomplishment
 - iv. Each Staff Estimate is Important
 - v. Refined COAs
 - vi. Coordinated Staff Divisions Products
 - vii. Principal Elements of Staff Estimates
- e. Commander's Estimate (**MDMP End**)
 - i. COA Analysis

- 1. War gaming
 - ii. COA Comparison
 - iii. COA Selection
- f. COCOM's Strategic Concept
 - i. Also called CONOPS
 - ii. Vehicle to distribute COCOM's decision and planning guidance

APPENDIX B

GLOSSARY

AOR--The geographical area associated with a combatant command within which a combatant commander has authority to plan and conduct operations.

AOI--That area of concern to the commander, including the area of influence, areas adjacent thereto, and extending into enemy territory to the objectives of current or planned operations. This area also includes areas occupied by enemy forces who could jeopardize the accomplishment of the mission.

AO--An operational area defined by the joint force commander for land and naval forces. Areas of operation do not typically encompass the entire operational area of the joint force commander, but should be large enough for component commanders to accomplish their missions and protect their forces.

Battlespace--The environment, factors, and conditions that must be understood to successfully apply combat power, protect the force, or complete the mission. This includes the air, land, sea, space, and the included enemy and friendly forces; facilities; weather; terrain; the electromagnetic spectrum; and the information environment within the operational areas and areas of interest.

Campaign Plan--A plan for a series of related military operations aimed at accomplishing a strategic or operational objective within a given time and space.

Center of Gravity--Those characteristics, capabilities, or sources of power from which a military force derives its freedom of action, physical strength, or will to fight.

Commander's Intent--A concise expression of the purpose of the operation and the desired end state that serves as the initial impetus for the planning process. It may also include the commander's assessment of the adversary commander's intent and an assessment of where and how much risk is acceptable during the operation.

Combatant Command--A unified or specified command with a broad continuing mission under a single commander established and so designated by the President, through the Secretary of Defense and with the advice and assistance of the Chairman of the Joint Chiefs of Staff. Combatant commands typically have geographic or functional responsibilities.

CCIR--A comprehensive list of information requirements identified by the commander as being critical in facilitating timely information management and the decision making process that affect successful mission accomplishment. The two key subcomponents are critical friendly force information and priority intelligence requirements.

Concept of Operations--A verbal or graphic statement, in broad outline, of a commander's assumptions or intent in regard to an operation or series of operations. The concept of

operations frequently is embodied in campaign plans and operation plans; in the latter case, particularly when the plans cover a series of connected operations to be carried out simultaneously or in succession. The concept is designed to give an overall picture of the operation. It is included primarily for additional clarity of purpose.

Constellation--A number of like satellites that are part of a system. Satellites in a constellation generally have a similar orbit. For example, the Global Positioning System constellation consists of 24 satellites distributed in six orbital planes with similar eccentricities, altitudes, and inclinations.

Coup de Main--An offensive operation that capitalizes on surprise and simultaneous execution of supporting operations to achieve success in one swift stroke.

Crisis Action Planning--1. The Joint Operation Planning and Execution System process involving the time-sensitive development of joint operation plans and orders in response to an imminent crisis. Crisis action planning follows prescribed crisis action procedures to formulate and implement an effective response within the time frame permitted by the crisis. 2. The time-sensitive planning for the deployment, employment, and sustainment of assigned and allocated forces and resources that occurs in response to a situation that may result in actual military operations. Crisis action planners base their plan on the circumstances that exist at the time planning occurs.

Decisive Point--A geographic place, specific key event, critical system, or function that allows commanders to gain a marked advantage over an enemy and greatly influence the outcome of an attack.

Deliberate Planning--1. The Joint Operation Planning and Execution System process involving the development of joint operation plans for contingencies identified in joint strategic planning documents. Deliberate planning is accomplished in prescribed cycles that complement other Department of Defense planning cycles in accordance with the formally established Joint Strategic Planning System. 2. A planning process for the deployment and employment of apportioned forces and resources that occurs in response to a hypothetical situation. Deliberate planners rely heavily on assumptions regarding the circumstances that will exist when the plan is executed.

Deterrent Options--A course of action, developed on the best economic, diplomatic, political, and military judgment, designed to dissuade an adversary from a current course of action or contemplated operations. (In constructing an operation plan, a range of options should be presented to effect deterrence. Each option requiring deployment of forces should be a separate force module.)

End state--The set of required conditions that defines achievement of the commander's objectives.

Enemy Capabilities--Those courses of action of which the enemy is physically capable and that, if adopted, will affect accomplishment of the friendly mission. The term "capabilities"

includes not only the general courses of action open to the enemy, such as attack, defense, reinforcement, or withdrawal, but also all the particular courses of action possible under each general course of action. “Enemy capabilities” are considered in the light of all known factors affecting military operations, including time, space, weather, terrain, and the strength and disposition of enemy forces. In strategic thinking, the capabilities of a nation represent the courses of action within the power of the nation for accomplishing its national objectives throughout the range of military operations.

Joint Force--A general term applied to a force composed of significant elements, assigned or attached, of two or more Military Departments operating under a single joint force commander

Joint Force Commander--A general term applied to a combatant commander, subunified commander, or joint task force commander authorized to exercise combatant command (command authority) or operational control over a joint force.

JSCP--The Joint Strategic Capabilities Plan (JSCP) provides guidance to the combatant commanders and the Joint Chiefs of Staff to accomplish task and missions based on current military capabilities. It apportions resources to combatant commanders based on military capabilities resulting from completed program and budget actions and intelligence assessments. The JSCP provides a coherent framework for capabilities-based military advice provided to the National Command Authorities.

JIPB--The analytical process used by joint intelligence organizations to produce intelligence assessments, estimates and other intelligence products in support of the joint force commander’s decision making process. It is a continuous process that includes defining the total battlespace environment; describing the battlespace’s effects; evaluating the adversary; and determining and describing adversary potential courses of action. The process is used to analyze the air, land, sea, space, electromagnetic, cyberspace, and human dimensions of the environment and to determine an opponent’s capabilities to operate in each. Joint intelligence preparation of the battlespace products are used by the joint force and component command staffs in preparing their estimates and are also applied during the analysis and selection of friendly courses of action.

Lines of Operation--Lines that define the directional orientation of the force in time and space in relation to the enemy. They connect the force with its base of operations and its objectives.

MOE--Tools used to measure results achieved in the overall mission and execution of assigned tasks. Measures of effectiveness are a prerequisite to the performance of combat assessment.

NMS--The art and science of distributing and applying military power to attain national objectives in peace and war.

NSS--The art and science of developing, applying, and coordinating the instruments of national power (diplomatic, economic, military, and informational) to achieve objectives that contribute to national security.

Objective--1. The clearly defined, decisive, and attainable goals towards which every military operation should be directed. 2. The specific target of the action taken (for example, a definite terrain feature, the seizure or holding of which is essential to the commander's plan, or, an enemy force or capability without regard to terrain features).

Operational Art--The employment of military forces to attain strategic and/or operational objectives through the design, organization, integration, and conduct of strategies, campaigns, major operations, and battles. Operational art translates the joint force commander's strategy into operational design and, ultimately, tactical action, by integrating the key activities at all levels of war.

Operational Reach--The distance and duration across which a unit can successfully employ military capabilities.

Physical Security--That part of security concerned with physical measures designed to safeguard personnel; to prevent unauthorized access to equipment, installations, material, and documents; and to safeguard them against espionage, sabotage, damage, and theft.

Prevention--1. The security procedures undertaken by the public and private sectors in order to discourage terrorist acts. 2. In space usage, measures to preclude an adversary's hostile use of United States or third-party space systems and services. Prevention can include diplomatic, economic, and political measures.

Protection--1. Measures that are taken to keep nuclear, biological, and chemical hazards from having an adverse effect on personnel, equipment, or critical assets and facilities. Protection consists of five groups of activities: hardening of positions; protecting personnel; assuming mission-oriented protective posture; using physical defense measures; and reacting to attack. 2. In space usage, active and passive defensive measures to ensure that United States and friendly space systems perform as designed by seeking to overcome an adversary's attempts to negate them and to minimize damage if negation is attempted.

Reconnaissance--A mission undertaken to obtain, by visual observation or other detection methods, information about the activities and resources of an enemy or potential enemy, or to secure data concerning the meteorological, hydrographic, or geographic characteristics of a particular area.

Space Control--Combat, combat support, and combat service support operations to ensure freedom of action in space for the United States and its allies and, when directed, deny an adversary freedom of action in space. The space control mission area includes: surveillance of space; protection of US and friendly space systems; prevention of an adversary's ability to use space systems and services for purposes hostile to US national security interests; negation of space systems and services used for purposes hostile to US national security interests; and directly supporting battle management, command, control, communications, and intelligence.

Space--A medium like the land, sea, and air within which military activities shall be conducted

to achieve US national security objectives.

Space Asset--Any individual part of a space system as follows. (1) Equipment that is or can be placed in space (e.g., a satellite or a launch vehicle). (2) Terrestrially-based equipment that directly supports space activity (e.g., a satellite ground station).

Space Capability--1. The ability of a space asset to accomplish a mission. 2. The ability of a terrestrial-based asset to accomplish a mission in space (e.g., a ground-based or airborne laser capable of negating a satellite).

Space Environment--The region beginning at the lower boundary of the Earth's ionosphere (approximately 50 km) and extending outward that contains solid particles (asteroids and meteoroids), energetic charged particles (ions, protons, electrons, etc.), and electromagnetic and ionizing radiation (x-rays, extreme ultraviolet, gamma rays, etc.).

Space-Faring Nation--A nation with the ability to access space capabilities using their indigenous space systems.

Space Force Application--Combat operations in, through, and from space to influence the course and outcome of conflict. The space force application mission area includes ballistic missile defense and force projection.

Space Force Enhancement--Combat support operations to improve the effectiveness of military forces as well as support other intelligence, civil, and commercial users. The space force enhancement mission area includes: intelligence, surveillance, and reconnaissance; integrated tactical warning and attack assessment; command, control, and communications; position, velocity, time, and navigation; and environmental monitoring.

Space Forces--The space and terrestrial systems, equipment, facilities, organizations, and personnel necessary to access, use and, if directed, control space for national security.

Space Power--The total strength of a nation's capabilities to conduct and influence activities to, in, through, and from space to achieve its objectives.

Space Superiority--The degree of dominance in space of one force over another that permits the conduct of operations by the former and its related land, sea, air, space, and special operations forces at a given time and place without prohibitive interference by the opposing force.

Space Surveillance--The observation of space and of the activities occurring in space. This mission is normally accomplished with the aid of ground-based radars and electro-optical sensors. This term is separate and distinct from the intelligence collection mission conducted by space-based sensors which surveil terrestrial activity.

Space Systems--All of the devices and organizations forming the space network. These consist of: spacecraft; mission packages(s); ground stations; data links among spacecraft, mission

or user terminals, which may include initial reception, processing, and exploitation; launch systems; and directly related supporting infrastructure, including space surveillance and battle management and/or command, control, communications and computers.

Space Weather--The conditions and phenomena in space and specifically in the near-earth environment that may affect space assets or space operations. Space weather may impact spacecraft and ground-based systems. Space weather is influenced by phenomena such as solar flare activity, ionospheric variability, energetic particle events, and geophysical events.

Strategy--The art and science of developing and employing instruments of national power in a synchronized and integrated fashion to achieve theater, national, and/or multinational objectives.

Tactics--1. The employment of units in combat. 2. The ordered arrangement and maneuver of units in relation to each other and/or to the enemy in order to use their full potentialities.

Target--1. An area, complex, installation, force, equipment, capability, function, or behavior identified for possible action to support the commander's objectives, guidance, and intent. Targets fall into two general categories: planned and immediate. 2. In intelligence usage, a country, area, installation, agency, or person against which intelligence operations are directed. 3. An area designated and numbered for future firing. 4. In gunfire support usage, an impact burst that hits the target.

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